DOCUMENT RESUME

ED 042 504 PS 003 412

AUTHOR	Ortar, Gina; Carmon, Hanna
TITLE	An Analysis of Mothers' Speech as a Factor in the Development of Children's Intelligence.
INSTITUTION	Hebrew Univ. of Jerusalem (Israel).
SPONS AGENCY	Ministry of Education and Culture, Jerusalem (Israel).
PUB DATE	Aug 69
NOTE	116p.
EDRS PRICE	EDRS Price MF-$0.50 HC-$5.90
DESCRIPTORS	Cross Cultural Studies, Early Experience, Family Environment, *Intellectual Development, *Language Patterns, Language Usage, *Oral Communication, *Parent Child Relationship, *Sociocultural Patterns, Speech Evaluation

ABSTRACT

The present study aimed: (1) to systematically describe and classify the speech input received by children of specified ages from their mothers in the home, (2) to investigate the interdependence between the quality of the mother's speech, her socio-cultural background, and her children's level of intelligence, and (3) to determine whether some attributes of the mother's speech can be modified if she wishes. The speech of 57 mothers from two ethno-cultural groups was recorded during two 60-minute sessions in each home. Siblings of two ages were observed: a child not yet talking (about 1 year old), and a child already talking (about 3 years old). A third visit yielded background information from the mother, and during a fourth visit (1 year later), the older child and the mother were given intelligence tests. The units of speech analyses were words and sentences, dealing with speech aspects of amount, content, and form. Although all variable factors affecting verbal behavior were not controlled, study results yielded (1) meaningful measurement of four aspects of speech, and establishment of preliminary norms to evaluate a mother's manner of speech, (2) significant correlations of the children's intelligence level with the measures of mothers' speech, and (3) preliminary indications that readiness and ability of the mother to modify her speech is correlated with her intellectual level (part of an ongoing experiment). Appendixes are included. (Author/NH)

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AN ANALYSIS OF MOTHERS' SPEECH AS A FACTOR IN THE DEVELOPMENT OF CHILDREN'S INTELLIGENCE*

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The Hebrew University School of Education, Jerusalem, 1969

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THE CONTENTS

I. THE PROBLEM

1. Intelligence, language and environment 1
2. The input of speech 5
3. The acquisition of speech 6
4. Cultural differences 10

II. GENERAL OUTLINE OF THE STUDY

1. The purpose 14
2. The subjects and their socio-cultural background 15
3. The setting of the observations 20
4. Variables dealt with in the study 22
5. The methods of computation 27

III. THE RESULTS

1. Amount of speech 29
2. Topics of speech 31
3. Correspondence of content to situation 35
4. Quality of words 52
5. Quality of sentences 63
6. Repetitiveness of speech 72

IV. SUMMARY AND CONCLUSIONS

1. Main results 77
2. Conclusions 88

V. APPENDICES

1. Rating and scoring instructions 92
2. Samples of verbal interaction 98

Acknowledgements

The main assumptions underlying this study were often discussed with several of my colleagues at the Hebrew University, some of whom also helped in determining the principles of classification of mothers' speech.

I wish therefore to acknowledge my indebtedness to Dr. Leah Adar, Dr. Haim Adler, Dr. Charles Greenbaum, Dr. Daniel Kahneman, Prof. Elihu Katz and Dr. Deborah Kubovy. The main research assistants - Mrs. R. Ben-Ishay, B.A., Miss H. Eisenberg, B.A., Mrs. N. Gluck, B.A., Mr. Y. Kovarsky, B.A. and Mr. J. Tawil, B.A. - also contributed many ideas and procedural refinements which were incorporated in the study. I am especially grateful to Mrs. H. Carmon, B.A., for her initial assistantship which developed later into co-authorship.

Gina Ortar

Jerusalem, August 1969

I. THE PROBLEM

1. Intelligence, Language and Environment

There is an overwhelming consensus of opinion that the functional level of intelligence (whatever the specific definition of the term) is the result of a prolonged interaction between hereditary and environmental factors. The level of education and the socio-economic status of the parents seem to be the most potent environmental influence on the children's I.Q. (Bayley, 1955, Honzik, 1947) and there is also clear evidence that foster children, as a group, are similarly affected (Skodak, 1939).

The impact of the environment is measurable without doubt after the age of 18 months (Bayley, 1955), but some studies stress the socio-economic factor in the amount of vocalization of babies aged 6 months or even less (Brodbeck and Irwin, 1946; Catalano and MacCarthy, 1954; Escalona and Moriarty, 1961). Early differences do not disappear when the child enters school - on the contrary, they seem to increase with the rise in the child's age. This would indicate that school is not a very effective environmental factor in modifying the effects of early environment.

Of the specific mental abilities, language and in general so-called verbal skills seem to be most affected by the environment :

a correlation of r = .42 has been found between the index of Status Characteristics and the Verbal Comprehension subtest of the Thurstone Primary Abilities Tests (Havighurst and Breese, 1947, cited in Anastasi, 1958). A parallel result, discussed in detail, appears in the study by Eells, Davis and al.(1951), and also in a paper by Knief and Stroud (1959).

The close relation between language and general intelligence can be explained superficially by the large proportion of verbal-skill items in intelligence tests. At a deeper level, the processes of "verbal mediation" or "covert language" are assumed to be of decisive importance also in the solving of non-verbal problems (Ainsworth, 1962). It is therefore tempting to investigate verbal stimuli as the possible specific causes of a lag (or an acceleration) in the verbal as well as in the general cognitive development of the child. However,most of the attempts to evaluate the environmental contribution, stress, in the first place, the emotional atmosphere of the home. The mother's "concern" whith the child's development (Moss and Kagan, 1958) is regarded as a potent stimulus for care or neglect in the use of language as a means of communication. Bloom (1964), though stating that we do not know precisely what constitutes abundant and deprived environments, goes on to enumerate the environmental factors to which differences in general intelligence are likely to be related, as follows :

1. Good models of language and encouragement of its development.
2. Opportunities for interaction with the world as it is and as it is represented by books, pictures, films, etc.
3. Opportunities to solve problems and encouragement to think clearly.
4. The nature of interaction between children and adults.

This mixture of affective and cognitive factors does not lead to experimental isolation and subsequent evaluation of the relative importance of each of these aspects and this situation is probably the main reason why Fowler (1962) states that the child's development may be modified or delayed by manipulation of his language environment, though little is known of the exact nature of that environment.

Nevertheless, without this knowledge, no hypothesis can be proposed for testing the specific relations between the variables of the mother's (and the father's ?) speech and the dimensions of the child's language (or his general verbal abilities). Thus, in order to investigate the relations between the mother's speech and the child's development, the authors had first to locate the relevant variables in the verbal interaction of the mothers with their children.

A normal child's gradual acquisition of speech can be seen as a process composed of the interaction among three distinct factors : (a) the language input, i.e. the speech heard by the child; (b) the child's inner mechanism for processing the received stimuli; (c) the language output, i.e. the child's utterances.

The last factor has been much discussed and investigated and a succession of developmental stages, quite similar for different languages, has been defined for the "normal" child (Ervin-Tripp, 1966).

The second factor, which might well be described as a "black box", is arousing much controversy. Many theories as to the ways by which a child learns to speak have been put forward and discussed, but none can account satisfactorily for the entire process (Bruner, 1964). The only aspect on which there is no disagreement is the hereditary character of this mechanism. It is inborn in man and its functions depend on maturation; no learning process needs to be postulated for the primary verbal sounds.

2. The Input of Speech

However, there seems to be general agreement as to the importance of the speech heard by the child as a stimulus in the learning process. Language has to be acquired and - differently to the motor exploration of the environment which can be done without guidance - some kind of active assistance by another speaker is necessary (John, 1963). This assistance is rendered by the people surrounding the child; its total amount may be regarded as the speech input.

Of the persons who constitute the child's human environment, the mother is - at least in the normal Western family - by far the most prominent significant figure. Among her other functions, her speech is, for most children, the main component of their early verbal environment, and it is therefore somewhat surprising that there have been practically no systematic attempts to describe her speech and to analyse her "teaching techniques" and "curriculum" , as applied to her children in the natural setting of their home (Ortar, 1966a).

A perusal of literature on the subject yielded some references on the attributes of the mother's speech as observed or conceived by the investigators. Most of the descriptions were found in studies dealing

PS 003412

with the acquisition of speech, while others appear in researches on cultural differences in the verbal development of children. On the other hand, reports and analyses concerning the methods of socialization were relatively unprofitable since the mother's verbal behavior was described or classified according to the underlying approach of the investigation and not in terms of the actual utterances. A comparatively recent study (Pavenstedt, 1965) may serve as an example of this type of research. Only two studies in which an actual mother-child situation was observed (Walters and Connor, 1964 Zunich, 1961) yielded some separate data on the verbal aspects of the interaction.

3. The Acquisition of Speech

A short survey of the attributes to be found in the speech heard by the young child is best begun with Jespersen's (1952) remark that children would never learn to talk if they were surrounded exclusively by thinkers who use language only as a means of communicating thought. Luckily for children, observes Jespersen, in their earliest years they have the chance of hearing mother, nurse, and other women talk with "everlasting repetitions even when they are absolutely certain that the dear baby does not understand a syllable of what they say".

A similar conviction is voiced by Lewis (1959) who sees the main contribution of the mother's speech in repetition of the child's words in different contexts, thus building up connections with outside situations.

Brown and Bellugi (1964) point out how short, simple and perfectly grammatical were the sentences spoken by the mothers they observed to their children. The investigators perceive these sentences as repetitions of the child's utterances (i.e. "Eve lunch") coupled with expansion through addition of words and inflection (i.e. "Eve is having lunch"). The end result is the hearest properly formed complete sentence which also fits the circumstances, since the mother described the actual situation. The order of the child's words is preserved by the mother, who adds words and inflection, but behaves as if the child's words were a constant. It is worth noticing that "expansions" of the two mothers investigated in Brown and Bellugi's study took up about thirty percent of the time.

This kind of expansion through addition of words and inflections might also be regarded as a process of correction which - according to some investigators - is one of the most important features of the mother's speech (Miller and Ervin, 1964). With somewhat older children, expansion of their sentences is also a means of imparting to them the adult system of sentence construction (McNeill, 1966). A different view is contained in an unpublished paper by Cazden (1964) who found that "richness" of verbal stimulation was more important for language development than the contingency of the adult's response to the preceding utterance of the child. John and Goldstein (1964) stress the importance of a corrective feedback, while Hunt (1964) is of the opinion that the main contribution to the child's language development consists of providing him with a variety of linguistic patterns and with answers to his questions. A similar view is presented by Baldwin (1965).

Several heterogeneous attributes of language input are enumerated by Fodor (1966), who points out that adults sometimes resort to "baby talk"; that at other times they consciously simplify their sentences; that adult speech must include false starts, slips, grammatical mistakes and other violations of language; that the utterances of children are sometimes corrected; and that there are enormous differences in the amount of linguistic attention and tuition. One of the "violations" of language is mentioned by Bresson (1963), who states that adults often refer to objects which are directly at hand by pronouns, not nouns. The child has therefore to rely on verbal contexts rather than on associations of the noun with the visible referent.

A single study concerned directly with mothers' speech, though not in a "natural" situation, appeared in Japanese (Murata and Ohara, 1966).

According to the short English summary, speech samples of 10' duration were collected during an interaction of the mother (N = 40) with her 1 year old child in two situations. The results showed that the mother was the main initiator of "dialogues" . Of the three functional categories, "reply" was most frequent, "request" was the next, and "report" the least frequent. More than half the "replies" were "active and complex", consisting of "corrected imitations" and other, more elaborated forms of speech. Most of the aspects of mothers' speech, i.e. frequencies as well as forms, depended on the nature of the particular situation.

In a descriptive account of her methods for intentional development of her child, Sackville-Stoner (1914), referring to speech, says that "as any sound makes a great impression on babies, there is no reason why any child cannot be taught to talk when it is a year old, if the mother talks to her baby as if the little one understood her". At the same time, she regards "baby talk" as detrimental "because the child has to learn two words for almost every thing he sees".

A detailed account of speech to be applied by mother substitutes to children in day nurseries is contained in a Russian guidebook for nurses and caretakers (Kupriyanova and Fedoseyeva, 1965). The nurse is instructed to vocalize and to pronounce clearly syllables and short words when the baby is 5-8 months old; she is to begin to name objects for babies 9-10 months old and also to say verbs describing her own as well as the baby's activities. This is to be done mainly during the caretaking, but specially designed short play-periods are to be held in order to ensure development of speech, including labeling, vocabulary, etc. up to the age of 3 years.

4. Cultural Differences

Most of the studies are concerned with children already able to communicate verbally with their environment. The authors deal with those attributes of the parents' speech which are assumed to cause the socio-cultural differences in the children's language.

Bernstein, for instance (1961), enumerates 10 characteristics of the "restricted code" and 8 of the "elaborate" code, but this discrimination could not be applied meaningfully to utterances addressed to children who are just beginning to speak . Thus, in the "restricted" code the sentences are short, grammatically simple, often unfinished; only simple conjunctions like "so, then, because" are used and then often repeated; adjectives and adverbs are limited in number and used rigidly;

there is a large number of phrases reinforcing the preceding sppech sequence, e.g. "Wouldn't it?, You see?, You know?". It is difficult to maintain that these characteristics of speech are as "restricting" for the one-year old as they are for the older children or youngsters.

Of the attributes to be found in the "elaborate code", not more than four might perhaps be detected in speech intended for a small child: sentences which are correct with regard to grammatical order and syntax; use of prepositions indicating logical relationship as well as temporal and spatial contiguity; recourse to the personal pronoun "I"; discriminative selection from a range of adjectives and adverbs.

Hess and Shipman (1955), following Bernstein, stress the difference between a sentence which presents to the child a rule or calls for a simple response (status-oriented) and a sentence or a number of sentences which convey to him the possibility of alternative actions and ask him to reflect and to discriminate(person-oriented).

For research purposes, Hess and Shipman use the following dimensions of mother's speech (elicited in a standardized situation in which the mother had to teach her child three simple tasks) : (a) total amount of verbal output, (b) length of sentence, (c) the quality of language as evidenced in the proportion of abstract nouns and verbs, use of complex syntactic structures and elaborations etc.

An investigation of the relation between environment and intelligence (Wolf, 1963, cited in Bloom, 1964), assumes the existence of 13 environmental process variables, which account for "the interactions between parents and children insofar as intelligence development is concerned". Of these 13 variables, 4 are connected with language under the heading of "Press for language development". They are : emphasis on use of language in a variety of situations; opportunities provided for enlarging vocabulary; emphasis on correctness of usage; quality of language models available. Wolf believes that these variables are relatively stable for the family, being characteristics of the parents and the home and independent of the child's characteristics and responses.

The data on Wolf's "process" variables are to be elicited during an interview; other researchers mention attributes based on observations of verbal interactions between children and their social environment; there is no indication as to which observed attributes are specific to the mother's way of addressing her child and which are common to the whole family or even the peer group.

Though Deutsch (1964a) does not specify the qualitative differences in speech between the social classes, he states that "it is the active verbal engagement of people who surround him which is the operative influence in the child's language development". A feature which marks impoverishing conditions is lack of language feedback in the child's interaction with the adult. In one of his studies (1964 b) the amount of conversation at dinnertime is mentioned as a measure of this verbal interaction.

His recommendations (Deutsch, 1964 a) for training children of pre-school age in language skills are similar to those specified for babies in the Russian handbook (Kupriyanova and Fedoseyeva, 1965). Words should be placed in meaningful contexts; there should be orienting (e.g. expanding) feedback, verbal labelling and verbal relating of objects and experiences.

This short survey of the research touching on the different features of language heard by the child excludes the affective attributes of verbal as well as non-verbal interaction, since these are outside of the scope of this study.

II. GENERAL OUTLINE OF THE STUDY

1. The Purpose

An attempt is made to analyze mothers' speech as one of the most important factors in the child's early environment, affecting, inter alia, his speech and his intellectual development. Following the method prevailing in most of the studies on language acquisition, the mother-child verbal interaction will be approached without reference to its affective content or connotations. This is not because of a belief that the affective relations are less important than the cognitive aspects. All human environment involves an interaction between these factors, but any subsequent research should be much easier and less controversial if the contribution of at least the non-affective variables can be measured in objective terms.

The aims of the study are therefore as follows:

(1) To describe systematically and to classify the "speech input" received by children of specified ages from their mother at home.

(2) To investigate the interdependence between the quality of the mother's speech and (a) her socio-cultural background, (b) the children's level of intelligence.

(3) To determine whether some of the attributes of the mother's speech can be modified according to her decision and intent.

2. The Subjects and their Socio-Cultural Background

Speech was recorded in the homes of 57 mothers, of whom about two thirds were born in Israel; the remainder immigrated to Israel before the age of 15; all mothers spoke Hebrew to their children.

The mothers belonged to two ethno-cultural groups quite clearly differentiated in Israel's population : 33 of them were "Oriental" and 24 "European". The Oriental group owes its name to the fact that this part of the Jewish people spent many centuries of the Diaspora in North Africa and the Middle East, while the Western group was living in Europe and recently also in America. Both groups, inspite of living in more or less distinct isolation from the general population, were probably affected by the level and the quality of the culture prevalent in the host countries. The transfer to Israel has, up to date, not yet obliterated the cultural differences between the immigrants or between their Israel-born children. The Oriental group (or groups, according to the specific country of their origin) is - on the average - less well educated, has a much smaller proportion of professional people and a much higher proportion of unskilled or partly skilled workers than the European; the children experience considerable difficulties in school, especially at the higher levels of education.

Though all mothers were housewives at the time of the observations and therefore were at home in the mornings, 93% of them had worked at some previous time. (Currently working mothers' interaction with their children would have had to be observed during the afternoon or evening and the presence or absence of the father as well as his consent or refusal, would have introduced a number of additional variables or constraints). Only intact families were investigated. Moreover, mothers who had been to a special school or were social-care cases were also excluded.

It was expected that patterns of mothers' speech would vary with the age of child, not least because the level of the child's verbal skills would be an important factor in the interaction, possibly providing reinforcement for the mother. Siblings of two ages were therefore chosen for the observation : a child not yet talking (about one year old), and a child talking already more or less freely (about three years old). If there were other siblings, the children chosen were the two youngest in the family. There was no control for sex. It was originally intended to exclude mothers of more than 5 children, but it was later decided to leave in the group one mother of 7 children on whom the observations were completed before this fact was disclosed.

The original design envisaged 8 cells (two cultural groups by four levels of education), but the cell of European mothers of less than 4 years of schooling could not be filled at all, while two other cells also remained short of the planned 10 mothers in a cell. Though a special search was made, not enough European mothers of 5-7 years of schooling could be found; there were also too few Oriental mothers of more than secondary education. This shortcoming, caused by the socio-cultural structure of the Israel population, was intensified by the requirement of two children of specified ages and the mother's presence at home in the mornings.

The main background data on the observed mothers and their children are given in Table 1.

Table 1 : Mothers and children by relevant background variables

	Oriental group N = 33		European group N = 24	
	Mean	Range	Mean	Range
Mothers :				
1. Age	26;0	20- 34	27;5	22- 33
2. Years of schooling	7.3	0- 13	11.7	7- 19
3. I.Q. (two WAIS subtests)	84.7	61-124	110.2	80-139
4. No.of children	2.5	2- 5	2.9	2- 7
Older children:				
5. Age	3;1	2;5-3;10	3;0	2;4-3;9
6. Verbal I.Q. (M.I.L.I.)	102.7	70-126	112.6	88-137
7. Performance I.Q. (M.I.L.I.)	96.7	63-133	108.8	95-134
8. Full I.Q. (M.I.L.I.)	99.8	70-134	112.0	95-133
Younger children:				
9. Age	1;2	0;11-1;6	1;2	0;11-1;4

As already stated, the mothers were not chosen at random. The differences between the two groups are nevertheless obvious; in a more representative sample of the population they would have been even more pronounced.

The differences in mothers' age and in the age and the number of children were not significant. (Within the population, the mean number of children is much higher in the Oriental groups).

The general disparity of the two groups in regard to the intellectual level is well known in Israel. However, the intercorrelations of the background variables (presented in Table 2), have not been investigated hitherto. (The data for the Criental mothers are presented in the upper right-hand triangle; those for the European mothers, in the lower left-hand one).

Table 2 : Intercorrelations between the mother's level of education and IQ and their children's IQ's

					Oriental group
Variables	1	2	3	4	5
1. Mothers' years of schooling	-	.57	.52	.56	.58
2. Mothers' I.Q.	.74	-	.65	.42	.63
3. 3 y. olds' I.Q. - Verbal	.38	.32	-	.48	.82
4. 3 y. olds' I.Q. - Performance	.03	.04	.20	-	.83
5. 3 y. olds' I.Q. - Full Scale	.20	.17	.71	.77	-
	European group				

The levels of significance were as follows:

The Oriental group (N = 33) : 5% level - r = .342; 1% level - r = .440

The European group (N = 24) : 5% level - r = .404; 1% level - r = .515

Even after corrections for the somewhat smaller standard deviations of the European group, the correlations of the Oriental group are higher. Considered as 10 pairs of correlations, the difference is significant at the 5% level on the Sign Test. Of the single pairs, only the correlation between the mothers' and the children's Full I.Q.'s is significantly (at the 5% level) higher for the Oriental group. (The data are too meagre for even a tentative suggestion that the I.Q. of a child belonging to the Oriental cultural group is dependent mainly on his mother's intellectual level, while for a European child other factors in his environment are also of much importance).

3. The Setting of the Observations

Each mother's speech was recorded in her home, in the morning, for two sessions of 60 minutes each. Several days intervened between the two observation periods. Handwritten records of the speech and of the relevant behavior were made by two girl students who introduced themselves as coming from the university, where they were participating in a "research on small children". They explained that the address was obtained from the child-welfare clinic which the mother visited periodically. Those mothers who inquired about the purpose of the research were told that it was being done in order to teach new-comers (immigrants) the ways of child-care in Israel.

The observers stayed on the scene of the mother-child interaction (moving if necessary to another room or to the kitchen) as unobtrusively as possible and recorded independently and verbatim all verbal interaction.[*] They also described activities of the mother and the children and any changes in the setting. In cases of a sustained interruption of the "normal" setting, caused by visitors or by one of the children's falling asleep etc., the observation was interrupted and resumed for a full hour on another day. The records of the two observers were transcribed immediately after the session into one single report.

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[*] No tape was used, since a fixed appliance would have entirely changed the "natural" situations and no portable device was then available in Israel.

The mothers' behavior was regarded as more natural during the second session in almost all cases, and in the main, therefore, it was the second record that was analysed. Only in a few cases, if the second period had been cut short by outside interference, was the terminal part of the first record used to complete one full hour of observation. In almost every session some words and sometimes even sentences, were not clear enough to be recorded by either girl, possibly because these words or sentences lacked meaning or adequate structure. Since the well-known trend to complete and correct unintelligible talk has probably also occurred, the records may be "better" than the actual speech to some unknown extent, though the observers were not acquainted with the criteria of evaluation.

As in all recording of spoken language, the commas, periods and other punctuation marks were inserted in accordance with the recorder's perception of the speaker's pattern of intonation; the personal preference of each recorder was presumably also a factor in the division into sentences.

A third visit followed, intended for assembling material on speech in a given situation. The mother was given a toy (the same for all children, consisting of a perforated board and colored beads) and asked to show the older child how to play with it. However, the technique was unsuccessful in producing similar situations : several mothers put the toy aside; others explained that the child was already familiar with it; and some gave it to the child without a word. Afterwards, the mother was asked questions about her background, her husband's occupation, and her opinion on the smaller child's understanding of speech.

An additional visit in the mother's home was made about a year later, in order to administer the M.I.L.I. (an Israel intelligence test for children aged 3 to 6 years). By then the older child was at the mean age of 4 years and could therefore be tested. At the same sitting the mother was given the Information and the General Comprehension Subtests of the WAIS, adapted ad hoc by substituting parallel items for those too specifically dependent on the American culture.

4. Variables dealt with in the Study

Though more data have been assembled, the present study is concerned only with the following variables :

(a) Mother's ethnic origin, an Oriental-European dichotomy.

(b) Mother's intellectual level, expressed in terms of Verbal I.Q. as prorated from two subtests of the WAIS (Information and General Comprehension), and in terms of the number of years spent in school, as reported by the mother to the observers on their third visit. Probably neither measure is very reliable, but no other data were available.

(c) Older child's level of intelligence, in terms of the Verbal,Performance and Full I.Q., measured with the Israeli M.I.L.I. Scale.

(d) Younger child's predicted mental level, Since no direct measure of the younger child's level of mental development was possible,the older child's I.Q. was assumed to be the best available predictor of his sibling's future level of intelligence. (The correlation between intelligence test scores of siblings cluster around r = .50. See Anastasi, 1958, p. 278).

(e) Speech variables, A sample of speech can be analyzed according to many criteria, e.g. content, methods of socialization, verbalization,grammar, syntax, emotionality, signs of mental illness etc. Since the ultimate aim of the present study was to discover those attributes of the mother's speech which might affect, negatively or positively, the child's verbal development, the dimensions for analysis were either chosen from the existing measures or specially constructed with this aim in mind. Most of these dimensions are based on , or related to, the assumptions of different researchers as to what constitutes an influential cognitive factor in the child's verbal environment. The dimensions are independent; a sample of everyday speech, including children's talk, may be analyzed according to one or more of them, depending on the purpose of the analysis.

The units of analysis were words and sentences and a preliminary definition of both was necessary in order to achieve a reasonable degree of objectivity and reliability.

A sentence was defined for this specific purpose, as the shortest sequence of words which was still grammatically a whole; however, any repeated word or words was included in the unit. Thus, the following sequence: "Go away, go away, David, / I am busy, / I have to cook now" would be counted as three sentences, as indicated. (It is immaterial, whether the word "David" was attached to the second instead of to the first sentence). In addition to increasing the reliability, this division into shortest sentences made it possible to apply the rating criteria to each unit separately, thus resolving the difficulty posed by one long sentence composed of parts of unequal merit.

A word was defined as a unit written separately, though in Hebrew it might include a preposition, the definite article or a possessive adjective. A word connected by a hyphen with "non" in order to give it the opposite meaning was also counted as one word.

In consequence of the two definitions and some other specific features of the Hebrew language, the sentences were probably shorter, on the average, than those usually reported in spoken English.

The mothers' speech has been evaluated on six aspects relating to its amount, content and form; most aspects were measured on more than one dimension and by means of several variables (Ortar, 1966 b).

The twelve dimensions dealt with are enumerated below, including the units of analysis.

Aspects and dimensions	Units of analysis
A. Amount of speech	
(1) number and percentage /* of words addressed to each child	words
(2) Number and percentage /* of sentences addressed to the child	sentences
B. (3) Topics of speech	sentences
C. (4) Correspondence of content to situation	sentences
D. Quality of words	
(5) Attention to vocabulary	sentences
(6) Structural words	words
(7) Type/Token Ratio	words
E. Quality of sentences	
(8) Sentence structure	sentences
(9) Overall length of sentence	words
(10) Net length of sentences	words
F. Repetitiveness of speech	
(11) Sentences containing repetitions	sentences
(12) Length of repetitions	words

/* computed on the base of the overall number of words (or sentences) directed by the mother at both children during the observation period.

5. Methods of Computation

Dimensions (4), (5) and (8) are expressed as ordinal scales, consisting of four levels. Each level is defined in terms of its supposed effect on the child's language.

The levels are :

Level E (Enriching) - Speech judged to improve the child's verbal development and consequently to further his understanding.

Level C (Conventional) - The most frequent manner of verbal expression, judged neither to further nor to hinder the child's "natural" progress of acquiring the language.

Level I (Insufficient) - Speech lacking those ingredients or qualities inherent in levels E and C which are deemed indispensable in order to avoid harm to the child's verbal development.

Level D (Detrimental) - Speech liable to cause confusion in the child's understanding.

The data on the "topics"scale, on the three ordinal scales and also on dimension (11) are presented as percentages of the number of speech units directed to each child during one hour of observation. This method of computation was preferred to absolute values because of the authors' impression that the amount of speech (i.e. the loquacity of the mother) was the least reliable factor, being probably affected by the presence of the recorders and - possibly - also by the nature of the task (Murata and Ohara, 1966). The percentages as well as other units were then converted into stanines to facilitate the summation of variables and the computation of Pearson's coefficients of correlation.

To check reliability, 7% of the sentences were randomly selected and analyzed by a rater who did not participate in the setting up of the criteria and who worked only on the basis of the final version of the rating instructions. The inter-rater reliabilities referred to in the following paragraphs were thus computed for 172 sentences for the one-year-old and for 400 sentences for the three-year-old child.

In addition to the inter-rater reliability, the inner consistency of the mothers' speech was computed. The correlation of odd-even sentences and the correlation between the first and the second half on the record were found for a representative sample of 11 mothers. Since both techniques yielded very similar results, only the consistency values based on the odd-even comparison are reported .

III. THE RESULTS

Each of the aspects is first described in terms of the different dimensions that can be used for its evaluation; samples of mothers' speech are added as illustrations. The means and ranges of each variable are then given in one or more tables in order to convey to the reader the general results; the results for each cultural group are given next, including the correlations with the mothers' and the children's mental level. In the concluding paragraphs some overall aspects of the study are presented and discussed.

1. Amount of Speech

The mean number of sentences and words, and the ranges of both measures are presented in Table 3 for each age separately, both in absolute values and in percentages.

Table 3 : Words and sentences uttered by the mother during one hour, by age of child

Variables	One-year-old		Three-year-old	
	Mean	Range	Mean	Range
No. of sentences	43.8	2-127	107.2	28- 271
No. of words	154.0	3-496	429.0	83-1177
% of sentences	29.4	2- 58	70.6	38- 98
% of words	26.4	1- 61	73.6	39- 99

The older child was much more often spoken to than the younger one. The difference is even more pronounced in the percentage of words (74%) than of sentences, because the sentences spoken to the three-year-old were, on the average, longer. The proportions for each child were very consistent for the mother: the split-half reliability reaching (for sentences) a Spearman rho of .987. The inter-rater reliability was also high : the raters disagreed in only 1.6% of the sentences.

A case could have been made for considering the speech uttered during the observation period as heard by both children, since both were present in the room. However, a try-out analysis performed under this assumption did not yield any meaningful results and the authors favour the assumption that the speech intended for a particular child has a special impact on the recipient. The importance of the speech going on around the child while other members of the family are interacting should nevertheless not be disregarded.

The results according to cultural groups show that the Oriental mothers uttered more words and sentences, and that the percentage of speech addressed by them to the younger child was somewhat higher. However,none of the differences was significant. This result was contrary to the exploratory observations conducted informally before the research has begun. As already mentioned, the authors assume that the amount of speech during a unit of time is a variable of low dependability.

A slight hint that at least the relative amount of speech directed at the smaller child might be an important indicator of the mother's verbal behavior, is contained in the following result : the percentages of sentences and words spoken to the one-year-old are correlated at the 1% level of significance with the European children's Performance I.Q. (and therefore also with their Full I.Q.). The lack of a similar result for the Oriental group is possibly an outcome of the obviously artificial behavior on the part of several of the least educated mothers who tried to show off their concern with the one-year-old.

2. Topics of Speech

As in any other non-formal verbal interaction, the mothers did not speak to their children according to an orderly plan. The sequences devoted to a single topic seldom consisted of more than 4 consecutive sentences, and even these were often interrupted by unrelated remarks. It was therefore necessary to score each sentence separately for topic; the overall proportions of topics were then computed under four headings :

(a) Incidental, (not concerned with caretaking), e.g. talk about toys, people or events : "Mummy has to do the dishes now"; "What did you do outside?"

(b) Nursing, e.g. talk about dressing, feeding, washing etc. "I'm now going to feed you your milk"; "Why did you soil yourself?"

(c) Incidental as in (a), but occurring during caretaking, i.e. talk divorced from business in hand.

(d) Expressions of emotion : "You are a sweet baby"; "Darling, darling, now, now"; "Naughty, naughty". If any other subject was also dealt with, the sentence was classified accordingly and not as expression of "emotion".

In the course of the analysis it was noticed that many mothers spoke to the older child about the one-year-old, e.g. "Look Ruthie, isn't David eating nicely?" or asked it to do something for the baby : "Quick, don't let Yaacov drop it". The authors supposed that this "alerting" behavior of the mother might be related to her efforts to widen the older child's understanding of his surroundings and decided to put it in a special category.

The percentage of units of speech devoted to each topic is shown in Table 4.

Table 4 : Topics of mothers' speech, by age of child
(percentages)

Topic	One-year-old		Three-year-old	
	Mean	Range	Mean	Range
All Topics	100	-	100	-
(a) Incidental		0 - 88	60	18 - 95
(b) Nursing	41	0 - 90	21	0 - 65
(c) Incidental during caretaking	14	0 - 59	8	0 - 57
(d) Expression of emotion	3	0 - 16	2.0	0 - 3
(e) "Alerting"	-	-	11	0 - 27

It is probale that the frequencies are very much dependent on the specific situations (Murata and Ohara, 1966), i.e. on the time of the day and the mother's schedule. The small frequencies would, probably , be more susceptible to change, e.g. the percentage of expressions of emotions would probably rise when the child is being put to bed or is ill. Nevertheless, the distribution of topics, as obtained during the period of observations, was highly reliable : for the different topics the split-half coefficients of correlation were between r = .90 and r = .98. The raters' agreement amounted to 94% and 88% for the older and the younger child, respectively.

The differences depending on child's age were obvious. The older child was usually spoken to on different subjects, while the younger heard more about caretaking than about anything else.

Expressions of emotion appeared in the speech of more than a third of the mothers in relation to the younger child and reached - for those mothers - 7% of all sentences on the average. This mode of speech was much less frequent for the older child: only one mother in 8 used such sentences.

There were no significant differences between the cultural groups in regard to the frequency of the three main topics of mothers' speech, so that it was decided not to separate the "incidental" speech into two classes. However, on the two topics which were less frequent and hardly dependent on the mothers' actual activities, some differences were obvious as to their interrelations with other variables. The European mothers' I.Q. and level of education is significantly correlated with the frequency of their alerting speech units (r = .49). This way of speech is also related to the older child's verbal I.Q. (r = .60); it was more frequent if the small child was younger.

The findings for the Oriental mothers are different. The frequency of "alerting" speech is uncorrelated with the mothers' or the older children's intellectual level. On the other hand, there are some significant correlations between this topic and the amount of mothers' speech directed at the younger child.

The "emotional" sentences were also used in a different way by the two groups. With the European mothers they were slightly dependent on their I.Q.s and there was a negative correlation between them and the tendency to repeat parts of the sentences($r = -.60$).This relation might point to an assumption that reinforcing sentences through repetitions might be a kind of substitute for "emotional", i.e. topic-less expressions. The intercorrelation for the Oriental group showed that the mothers tending to use more "emotional" sentences had, on the average, a higher number of speech units directed at the younger child.

The tendency to speak to the older child about the younger one and to use "emotional" utterances when speaking to the one-year-old was correlated for the Oriental mothers with an additional variable, concerning the adequacy of content in relation to the actual situation. This variable is described in the next paragraph.

3. Correspondence of Content to Situation

With very few exceptions, the mothers spoke to their children about their own or the children's activities, be it nursing or "incidental" topics. Though most of their speech contained a straightforward representation of the surroundings and the ongoing activities, there were also divergent utterances. Some of them fell short of the situation while others added to it some content or meaning which was not necessarily obvious. This quality of correspondence between the content of a sentence and the relevant segment of the environment seems to the authors to be one of the most decisive variables of speech in so far as the development of the child's understanding is concerned.

The general qualitative scale described in the section on "Methods of Computation" was found to provide a meaningful classification of 'correspondence to situation' :

Level E (encriching) :

The actual situation is not just reflected in the speech, it is also made richer through additional and relevant content, communicated to the child for the most part in words, but sometimes by intonation which means "the reverse is true" (irony). The following kinds of additions were rated as enriching the child's grasp of relationships over and above those visible in a situation :

(a) Reasons and other relationships (causes - logical or circumstantial, generalizations, comparisons, proposals of choice etc.). Some instances are : "Don't touch the lamp, you might get a shock"; "Go out of the room, Mummy wants to sweep the floor"; "Climb down from the chair, like you did yesterday"; "Let Uzzi play either with the doll or with the Teddy-bear".

Giving reasons and pointing out relationships seems to be a usual way of explaining things to the three-year-old - only 5% of the mothers had a zero score on this variant. In regard to the younger child the habit is less frequent; only 44% of the mothers offered such explanations. However, within the two age groups, there was no correlation between the child's age and the mother's frequency of explanations.

(b) Naming of inner stater of behavior : Though superficially similar, naming of behavior or inner state should be clearly differentiated from labelling of objects or persons, since the behavior or state, if not pointed out, would probably pass unnoticed by the child, while an object would, in general, be perceived even if it remained nameless (Kofsky, 1967). Consequently, we regard the naming of behavior as a means of enhancing the child's perception of his surroundings. The enlarging of his vocabulary is a possible but by no means a necessary corollary as it is quite possible that the words are already known to the child, though not in this particular connotation, e.g. "Are you happy?" "Say something, don't be shy".

A given sentence might sometimes fit both enriching variants, i.e. (a) and (b), but since the final score on E is the sum of subscores, reliability is not impaired. An instance of such a sentence would be the following : "You are yawning a lot, are you tired already?" which might be regarded as a cause and outcome or as a description of a state.

Only one half on the mothers hamed the behavior or the state when speaking to the younger child, but they did it comparatively frequently (in 4.7% of the sentences on average); in relation to the older child the habit was quite common among the mothers (only 16% had zero scores), but less salient : it occured in but 2.8% of their sentences. When the mean for all mothers was computed, both children got about the same proportion of "naming of inner states or behavior".

(c) Amplification of child's utterances into "conventional" or "enriching" sentences; giving "enriching" answer to child's questions.

This kind of verbal enrichment is well documented by different authors (Brown-Bellugi, 1964 ; Miller and Ervin, 1964), and the examples are often cited by others. One of our mothers said to her child in answer to "sun , sun" - "Yes, Ruthie is in the sun". Or - child : "It's cold," Mother : "Yes, it was in the refrigerator". According to our results, the proportion of the mothers who amplified their children's phrases or words was small : 20% in their speech to the younger child and 65% in the speech to the older one. However, the mean frequencies of such speech in these subgroups of mothers was much higher for the one-year-old : 3% in comparison with 1.9% to the three-year-old.

(d) Irony : the mother's true intent is being imparted to the child in a differently voiced sentence, seemingly opposite to the situation.

The child's perception of the speech is thus enriched, he learns that the meaning of a sentence might be wholly dependent on its intonation. Examples: "That's very nice, throwing your toys on the floor". "Go on, let all the milk spill on your new blouse".

Ironical speech appeared in the records of one out of three mothers in their talk to the older child but only with 9 mothers in their interaction with the one-year-old. One mother showed a clear predilection for this variant : she addressed two such sentences to the one-year-old and five to the three-year-old.

Overall results on the E (enriching) Level

The split-half reliability for the sum of scores on this level was rho = .91; the following Table 5 shows the mean contribution of the four variants considered as enriching.

Table 5: Enriching level, by variables and by age of child (percentages)

Variables	One-year-old		Three-year-old	
	Mean	Range	Mean	Range
All Variables (Sum)	4.9	0 - 19	11.4	0 - 29
(a) Reasons and relations	1.5	0 - 10	7.3	0 - 10
(b) Naming of inner state or behavior	2.5	0 - 11	2.3	0 - 10
(c) Amplification of child's speech	0.6	0 - 6	1.2	0 - 10
(d) Irony	0.3	0 - 5	0.6	0 - 3

The older child heard significantly more enriching speech. The difference between what the two children heard would be even more pronounced if the absolute numbers were compared, since the mother spoke, on average, about two and a half times as much to the older child.

Nevertheless, a somewhat surprising attribute of the "enriching" speech is its comparative rarity. The smaller child gets, on the average, about two such sentences during one hour. This seems to be much less than was generally implied; the twelve "enriching" sentences addressed during the same period at the older child are probably much nearer the tacit estimate of the students of this subject. However, most of the scores for the older child and all scores for the younger would be twice to three times higher if the zero-scoring mothers were excluded.

Level C (conventional)

The definition of such sentences is rather negative, because of a lack of any quality that is supposed either to further or to hinder the child's "normal" perception of the situation. There are two different variants of this level:

(a) Adequate sentences: this, the most frequent variant of everyday speech, is composed of simple descriptions of objects, directions or restraints. They reflect the situation adequately, so that a listener would be able to comprehend what is being done even without observing the activities of the speaker and of the other participators. Examples of such units speech are as follows : "Look, here is a cat". Rhetorical questions were also classified as adequate sentences : "Why did you break the train?".

No mother lacked entirely such adequate sentences and most of them used this form in more than half of their speech.

(b) Vague questions and false assurances : The mothers sometimes asked questions to which no answer was anticipated since none was possible. "Why are you such a fool?" asked of the one-year-old or "What shall I do with you?" asked of nobody in particular, exemplify this kind of vague speech.

Hardly connected with the actual situation was also speech ostensibly referring to the future, but containing only promises of reward or punishment, both unlikely to be fulfilled. "I'll spank you in a moment, if you don't finish this quickly"; "Your father will scold you when he comes back"; "Daddy will bring you a sweet, if you go to bed now" are examples of such assurances.

At first, this form of verbal behavior seemed to the authors to be less than adequate, since the lack of consistency between the mother's statement and the subsequent happenings could lead to bewilderment and to a damage in the formation of the concept of causality.

A partial support for this attitude was found in results for the European group which showed significant negative correlations between this variant and the mothers' and their children's I.Q.s. However, a different assumption was also possible, namely that the children learn very early to disregard such futile promises and threats and that it is for them a "conventional" form of speech. This point of view was supported by results for the Oriental group which showed positive though low correlations between the false assurances and some "good" qualities of speech.

The slight negative correlation existing between the "adequate" sentences and the vague questions and false assurances made the final decision to include both variants in the "conventional" level even more difficult, but no other way seemed preferable. The few cases of putting a threat into execution were scored as causes and outcomes and therefore "enriching".

Threats and promises are used as means of persuasion; 75% of the mothers had recourse to this way, mainly with the older child.

Overall results on the C (Conventional) level

As already mentioned in connection with the "adequate" variant, this level accounts for most of the recorded speech.

Table 6 : "Conventional" level, by variables and by age of children (percentages)

Variables	One-year-old		Three-year-old	
	Mean	Range	Mean	Range
Sum of Conventional level	72.1	0 - 100	78.7	58 - 93
(a) adequate to situation	67.9	21 - 100	74.8	52 - 92
(b) vague questions and false assurances	4.2	0 - 17	3.9	0 - 14

Level I (Insufficient)

A considerable part of everyday speech consists of verbal "shortcuts", i.e. of sentences which are too short or too ambiguous in relation to the content to be transmitted by them to the hearer. In extreme cases the speech may be absent altogether and the content conveyed by other means or not a all. Though it is true that the persons for whom the information is intended are usually able to follow most of the speaker's intentions (Hayakawa, 1941), the recipients of an insufficient verbal message (or of a silent message) can comply with it only if they have additional sources of information, i.e. they connect the present situation with previous experiences and respond accordingly.

Our assumption is that this manner of speech is probably injurious to the small child's verbal development . The frequent use of half-sentences and hints would probably lead, as Bernstein (1964) asserts, to a reduction of, and in some instances even to a dispensation with, the child's need for adequate verbal expression of his thoughts and feelings.

The common element in all variants of the I level is the wasting of an easy everyday opportunity to develop the child's language. This happens when the mother remains silent or when she neglects to mention an important component of the current situation.

There are three variants of the I level:

(a) Indeterminate Sentences : This, the most frequent occurrence of the I level, is defined as a sentence which does not impart sufficient content even in connection with three preceding or three following units. Thus, "No, don't!" "Why did you?" "Now, quickly" are classified as indeterminate, if the things to be done, or not to be done, or to be done quickly are not mentioned in the three closest units. The cutting point of just three sentences was chosen after a close inspection of many records, since the readers felt that beyond three units they could not be sure of the mothers' intentions.

Only three mothers had no "indeterminate" sentences when addressing the younger child and only one other mother was not heard to say something indeterminate to her older child.

(b) Inadequate responses : the second variant of the I category is composed of units whose meaning is clear enough; they are insufficient because the content is unsatisfactory in relation to the child's questions or to his other means of appeal for the mother's attention, like calling or babbling. The inadequacy might take on the form of responding irrelevantly or not at all, or of disregarding the child's erroneous statements (The child - "This doll is bigger" - the mother does not correct the statement, though the doll is actually the smaller one). Repeating the child's sentence instead of answering it belongs also to this variant ("I want a sweet, Mummy" - "You want a sweet?").

The relation between the number of mothers responding inadequately and the frequency of this behavior resembles the relation mentioned in connection with the amplification of child's behavior : many mothers (83%) respond thus when interacting with the older child, but not in any conspicuous amount (3.2%). On the other hand, though only 47% of the mothers react in this way to the younger child, they do so more often (5.6%).

(c) Lack of speech : for simplicity's sake, each caretaking activity unaccompanied by words was scored as one "Lacking" unit, though there is obviously no way of assessing just how many sentences should have been said during an interaction of a given length. Mother's overall score denotes, therefore, the number of occasions on which she failed to speak and thus missed an opportunity to refer verbally to her own or to the child's activities.

Two-thirds of the mothers remained silent at least once during their caretaking of the younger child, but only a quarter did so in relation to the older one.

(d) Overall results on the I level:

Split-half coefficients of reliability were higher for speech to the older child (rho = .84) than for speech to the younger (rho = 73).

As shown in the following Table 7, the mother's "sins of omission" are much more pronounced in relation to the younger child.

Table 7 : "Insufficient" level, by variables and by age of child (percentages)

Variables	One-year-old		Three-year-old	
	Mean	Range	Mean	Range
All Variables	22.4	0 - 63	9.4	2 - 24
(a) Indeterminate sentences	14.5	0 - 41	6.0	0 - 14
(b) Inadequate responses	2.6	0 - 39	2.8	0 - 7
(c) Lack of speech	5.3	0 - 57	0.6	0 - 4

The percentage of insufficient sentences occurring in the speech between parents or other adults living together is not known, but, since a short observation gives the impression that the "Insufficient" sentence is a common occurrence, it seems that this percentage would not differ very much from that observed in dealing with the older child.

Level D (detrimental)

A very small part of the mothers' verbal behavior consisted of sentences mis-stating or confusing the reality to an extent that was deemed detrimental to the development of the child's understanding. It did not relate to the future, like the "false promises" scored as Conventional, and it was too complete in regard to content in order to be regarded as Insufficient. The Detrimental units were contrary either to the immediate evidence of the senses or to the content of the foregoing sentence. Some of them would have been Enriching if the explanations contained therein were not false or even absurd.

The following examples refer each to a different form of contradiction: (a) "I have no more sweets left .... here, take a sweet" (a contradiction between the meanings of two sentences). (b) "Look, here is Daddy" (sentence and situation blatantly opposed). (c) "You have belly-ache, because yesterday you did not go to bed as I told you to"; or "You cannot have a fourth piece of chocolate, your teeth will break if you do"(the child's gullibility abused in a way that might damage his perception of causality).

Even when all variants of the "Detrimental" sentences were put together, the frequency of this kind of verbal behavior was very low and no estimates of reliability have been made.

Table 9: "Detrimental" level, by age of child (percentages)

Variable	One-year-old		Three-year-old	
	Mean	Range	Mean	Range
All variables	0.6	0 - 7	0.5	0 - 2

Though the means computed over all mothers show the opposite trend, the proportion of mothers having uttered at least one "detrimental" sentence was higher for the older (39%) than for the younger (21%) child.

Because of the rarity of scores in the "Detrimental" category, these have been included in the category of "Insufficient" speech for all subsequent computations.

Overall results on the "Correspondence of Content to Situation"

Table 9 reports all the different levels defining the quality of correspondence between the content of a sentence and the actual situation for the two ages. The inter-rater reliability for the aspect as a whole was 91% and 90% for the older and the younger child, respectively.

Table 9: "Relevance of content to situation", by levels and by age of child (percentages)

Level	One-year-old		Three-year-old	
	Mean	Range	Mean	Range
All levels	100.0		100.0	
Enriching	4.9	0 - 19	11.4	0 - 29
Conventional	72.1	0 - 100	78.7	58 - 93
Insufficient	22.4	0 - 63	9.4	1 - 24
Detrimental	0.6	0 - 7	0.5	0 - 2

The data show that the mothers explain much more when interacting with the older child and that they are apt to miss opportunities for at least a "conventional" speech mainly when speaking to the one-year-old. However, the general quality of a mother's attention to the correspondence between her speech and the situation is apparent in relation to both of her children: the correlations over siblings for the "enriching" and the "insufficient" (including the "detrimental") levels are significant at the 1% level. For the same child, the correlations between the "good" and the "impairing" speech are negative and again significant at the 1% level.

Correspondence to the situation in the cultural groups

The means for the two groups and the correlations with the mothers' and children's intellectual level are presented in Table 10. The "Conventional" level, complementing the percentages to 100%, is omitted.

Table 10: Means and correlations for "Correspondence to Situation", by levels, by age of child and by cultural groups

Age of child and level of correspondence	Mean of group		Correlations with		
	Orient. (N=33)	Europ. (N=24)	Mothers' (N=57) Education	I.Q.	Children's (N=57) Verbal I.Q.
One-year-old					
Enriching	3.7%	6.6%	$.37^{a}$	$.42^{b}$	.38
Insufficient	25.3%	19.7%	-.25	-.23	-.35
Three-year-old					
Enriching	3.7%	15.1%	$.47^{a}$	$.52^{a}$	$.39^{a}$
Insufficient	10.8%	8.9%	-.33	-.31	$-36.^{b}$

a - correlation also significant within the European group alone.

b - correlation also significant within the Oriental group alone.

r = .262 --- p = .05 r = .339 --- p = .01

All correlations of the Enriching speech with the mothers' and the children's intellectual level are significant at the 1% level while for the Insufficient level the correlations are lower and some of them do not reach the 5% level of significance.

Differences between the two cultural groups exist mainly in the intercorrelations between the variables; differences in the means of the Enriching and the Insufficient speech disappear with the partialling out of the education or the intelligence of the mothers. The two exceptions are: the "enriching" speech to the three-year-old which remains more frequent in the European group at the 5% level of significance and the much higher number of Oriental mothers (12) using "detrimental" sentences when speaking to the younger child in comparison with a single mother in the European group.

When each cultural group is considered separately, the correlations for speech to the one-year-old show that the Enriching speech is related to the European mothers' amount of education and the Oriental mothers' I.Q.

For the three-year-old, the Oriental mothers' enriching speech is not related significantly, either to her level of education, or to her I.Q. ; while "Insufficient" speech does correlate significantly with the child's I.Q. The Oriental mothers' speech is apt to be more adequate - though not more "enriching" - if the older child's verbal functioning is better.

The situation is different for the European mother : the level of her explanatory behavior is clearly related to her own and her child's understanding; the coefficients of correlations are even higher than the correlation between the mothers' and the children's I.Q.s (see Table 2).

4. Quality of Words

The words in mothers' speech have been evaluated in three ways:

(1) Attention to her own and her child's vocabulary.

(2) Proportion of "structural" words.

(3) Diversity of words in a sample of constant size.

Attention to Vocabulary.

The value of a word for the verbal development of a child cannot be assessed in isolation; a sentence is the smallest unit that has to be taken as a basis for the evaluation, but previous and subsequent utterances of mother and child, as well as surrounding objects and activities, are also important factors in deciding whether a given word should be regarded as having a special value.

A scale of four qualitative levels was again used as a basis for evaluating attention to words. Most of the mother's words have been regarded as being adequate, i.e. as being on the C (conventional) level. Only those words which fitted specific definitions were regarded as E (enriching), as I (insufficient) or as D (detrimental) for the child's development.

Level E (enriching)

On the basis of common-sense, all teaching of phrases, words and even syllables should have been considered as Enriching. However, a careful perusal of our records yielded an unexpected picture: it was the less educated mothers who asked her one-year-old to say words or even sentences which were neither connected with the task in hand nor within the baby's level of verbal skill. The mothers "taught" the child to say "thank you", to pronounce the names of siblings (not present) or even to repeat sentences such as "Daddy is not a home" or "Daddy went to work". Their interpretations of the child's syllables had little in common with the sound (Child: "da.. da..", mother : "yes, say Mummy, here is Mummy"). Suspicion that this kind of verbal behavior is hardly conducive to the child's development was confirmed by the negative correlations found between the frequency of such "teaching" of words and the level of mothers' and children's I.Q.

There were, of course, also mothers who seemed to teach words adapted to the child's verbal skill. However, the observers had no means of ascertaining whether a given word, stressed by the mother, had already been a part of the child's vocabulary. Consequently, the criteria for scoring a word as "enriching" are rather narrow. The E for enriching is assigned to a word in the following instances:

(a) naming an object or a person involved in the present activity, or naming an ongoing activity: "Here is your nap-pie, your nap-pie"; "Look at the rain, there is rain".

(b) naming pictures or objects in answer to the child's questions.

(c) completion of the child's syllables by incorporating them in a word, or letting the child complete a word begun by the mother .

(d) explaining and elucidating the word. This might be done by adding a synonym: "Now see this, look"; by inserting an antonym: "Don't run, go slowly"; or by the use of matching words: "If you sing to her, she'll listen", or "I washed the apple and then I peeled it, I have washed it before peeling".

(e) correcting the child's mispronounced or misused word: "That's not an orange, it's a grape-fruit, darling".

The difference between the E score for the "correspondence to situation" and the "attention to words" is worth stressing. "Naming of behavior or state" would be rated E also for the attention to words only if the concept were explained by the addition of a synonym, an antonym or a matching word, and not if it were made explicit by a concomitant happening or behavior. Thus, "why are you crying, are you hungry?" was scored E for naming of state but not for the "attention to word" since "crying" cannot be regarde as synonym for "hungry". The expansion of a child's utterance, scored E for "correspondence to situation" is not necessarly scored E for vocabulary. Thus, the expansion of the child's words: "Sun, sun" into : "Yes, Ruthie is now standing in the sun" was not intended to teach a new word according to our narrow criteria. However, the "translation" of "bo.. bo.. bo" into "here is a ball" is scored E for words but not for situation since no content was added to the child's perception. On the other hand, some sentences would be scored E for both dimensions: "You'll sing and she'll listen".

The percentage of sentences containing E words was quite small so that no meaningful differentiation of the variants was possible. The younger child heard, of course, more names of objects or activities, while the three-year-old had more words explained to him with the help of other words. About half of the mothers tended to use a very considerable number of E sentences when speaking to the one-year-old, while the other half did not have a single E score In contrast, the mothers' behavior with the older child was markedly more explanatory. Only a small number failed to explain words, but the frequency of E scores was not great.

Level C (conventional)

All words which did not belong to any other level were scored as C, even if they seemed to be "higher-level" words. Classification of words according to their frequency in the spoken language was impossible since there are no relevant data.

The C level was, of course, much more frequent than any other.

Level I (insufficient)

This rating was intended to denote opportunity to bring about the use of an appropriate term not seized upon by the mother. In her own speech insufficiency took the form of an omission of a particular term ; in relation to the child it was revealed in neglecting to correct the child's speech. Since there was no possibility of finding out whether the omitted term was already familiar to the child, it was impossible to decide whether the mother's omission would only teach the child to speak in a similar manner or whether it might perpetuate a deficiency in his vocabulary.

The score of I was thus given to: (a) pronouns, if the relevant noun was not mentioned in three preceding or three following sentences ("Go there, go"; "Eat it quickly now"); this variant appears in the speech of almost all mothers; (b) Failure to correct the older child's inappropriate or mispronounced words ("Mummy, Uzzi took his hat out". Mother: "It doesn't matter, we aren't in the sun now". The mother's answer is, nevertheless, "enriching" for content). Only 10 mothers showed this kind of disregard for the older child's speech.

Level D (detrimental)

Words were scored as detrimental if they seemed apt to impair the child's vocabulary. This was assumed to happen in the following instances: (a) words used inappropriately: (a) "Why do you disgust him?" when "tease" was meant; (b) "baby-talk" addressed to the older child; (c) repetition of the child's inappropriate words.

Instances of this level occurred in the speech of about 50% of the mothers, but they were quite infrequent. It was, therefore, decided to include the D scores in the I level for all further computations.

Overall results on the "Attention to Vocabulary".

The inter-rater reliability for this dimension was 95% for both children. The mothers' reliability coefficients were computed separately for the Enriching level (rho = .90), and for the Insufficient together with the Detrimental level (rho = .57). The results of the analysis of the mother's attention to vocabulary are shown in Table 11.

Table 11: "Attention to Vocabulary", by levels and by age of child (in percentages).

Level	One-year-old		Three-year-old	
	Mean	Range	Mean	Range
All levels	100.0		100.0	
Enriching	2.6	0 - 14	2.6	0 - 8
Conventional (residual)	90.2	76 - 100	90.7	73 - 99
Insufficient	6.7	0 - 24	6.1	0 - 19
Detrimental	0.5	0 - 6	0.6	0 - 6

The actual incidence of the I level in the mother's speech is probably higher than the percentage arrived at in the present analysis, because the main variant of this level - the use of a pronoun without reference to the relevant noun - was scored only once, though it might have appeared again in the next sentence.

There are no significant negative correlations between the Enriching and the Insufficient (including the Detrimental) levels. This might be interpreted as an indication that the positive and the negative aspects of the attention to vocabulary are quite different facets of speech.

Structural words

It has been shown that the small child learns first nouns and verbs and that the use of most of the "relational" or "structural" words is a later acquisition. Though it is still an open question, whether the use of such words follows after the child has grasped the concept, or vice-versa, the "input" of them might be regarded as important for the developing of the child's understanding. When made explicit, the concept of cause and effect, of time, of order and of other relations becomes anchored in a comparatively simple and short word; the word can then be detached from the specific context and still preserve its meaning - it becomes an abstract concept.

Forty such words, used by the mothers, have been listed, most of them conjunctions (but, or, because, perhaps) or relative adverbs (together, as, inside, instead of); others would be translated into English as prepositions or adjectives (by, like, for).

For each mother, the proportion of all structural words and also for different structural words was computed. For this purpose, the first 660 words uttered by the mother (or less than that if all of her speech during one hour did not amount to 660) were taken from the beginning of the record and classified. Since the proportion of words addressed to each child varied considerably, the percentages were computed on different bases. The results were as follows:

Table 12: Structural words, by age of child

Statistic	One-year-old		Three-year-old	
	Mean	Range	Mean	Range
Number of different structural words	1.0	0 - 5	6.5	1 -15
Percentage of different* "structural" words	1.4	0 - 6.0	3.8	0.7 - 6.7
Percentage of all** "structural" words	0.9	0 -11.7	2.6	0.4 - 5.1

* Computed by dividing the number of different structural words by the number of different words in the sample of speech.

** Computed by dividing the number of all structural words by the number of all words in the sample of speech.

The use of structural words was much more frequent in relation to the older than to the younger child, especially when the absolute number is considered; but the single extremely high maximum value for the younger child in the percentage of all structural words is worth noting. No correlation for any of the three measures was found between the children.

Since the repetition of structural words should probably be regarded as beneficial to the child's verbal development, further computations were based on the percentages of all structural words.

Diversity or Words : Type/Token Ratio

Of the various methods used to determine the verbal diversification of speech, the index of type/token ratio (TTR) has been added to the other measures of the quality of words. It was computed on the same sample of 660 words, but as the number of words for each age differed widely, the TTR showed its well known trend to decrease with the increase in the number of analyzed words (Miller, 1963). The correlations between the number of words and TTR were $r = -.47$ and $r = -.58$ for the older and the younger child respectively. The correlation between the number of Types and the number of Tokens was $r = .75$ for the older and $r = .93$ for the younger child.

The reliability of the TTR has been computed for the speech of 20 mothers by correlating samples from records taken on different days and thus -

probably - relating to different topics of speech. The Spearman-Rho correlation coefficient was only rho = .54 for the older child (significant at the 2% level), and rho = .41 for the younger child (significant at the 10% level only). However, the mean TTR's for the group of 20 mothers differed only by .01 for each child when the means for the two records were compared.

Table 13 below refers to the TTR's for the whole group of 57 mothers.

Table 13: Type/Token Ratios in mothers' speech, by age of child

Statistic	One-year old		Three-year-old	
	Mean	Range	Mean	Range
Number of words analyzed	148	17 - 389	419	127 - 635
Type-Token Ratio	.42	.29 - .66	.40	.25 - .56

The ratios for the siblings were not correlated. On the whole, the TTR in its simple form has no features to recommend it for a meaningful analysis of mothers' speech. A transformed measure, with number of words held constant and found to correlate with some background variables, has been used for further computations in this study.

Quality of Words in the Cultural Groups

The results on the three methods of assessing quality of words have been combined in Table 14, in which the means for each cultural group are given next to coefficients of correlation with the mothers' and the children's I.Q.'s.

Table 14: "Quality of Words", by dimensions, by cultural groups and by age of child

Variables	Means of group		Correlation with		
	Oriental	European	Mother's Educ.	Mother's I.Q.	Child's V I Q
I. One-year-old					
1. Attention to words					
Enriching	1.8	3.7	.29[a]	.40[a]	.36[a]
Insufficient	7.3	7.2	-.18	-.02	-.18
2. Structural words	0.7	1.3	.15	.03	.01
3. Type/Token Ratio	.42	.43	.21[b]	.01	.07
II. Three-year-old					
1. Attention to words					
Enriching	2.0	3.4	.26	.21	.30
Insufficient	7.2	6.0	-.39[b]	-.37[b]	-.19
2. Structural words	2.3	3.2	.28	.53[b]	.48[b]
3. Type/Token Ratio	.39	.41	.44[ab]	.36[b]	.38[a]

a and b — as in Table 10.

On the whole, the quality of words used by the mother in her verbal interaction with the one-year-old does not depend on her intellectual level, nor does it predict the child's future I.Q. - whatever way is used for measuring this factor. The single exception is the array of high correlations of "enriching" words found for the European mothers. For them, the variable is related to the mothers' education and I.Q. and it predicts the child's intelligence at the 1% level of significance. The correlations for the research population as a whole reflect mainly the correlations for the European mothers. For the Oriental mothers the correlations were in general low and insignificant. The one correlation (significant at the 5% level) between the TTR and the Oriental mothers' level of education is unsupported by any other results.

Most of the correlations for the older child are caused by the correlations within the Oriental group. However, in the case of the TTR, i.e. the tendency to speak in a more variegated language, the European mothers show a correlation with their own level of education and the child's actual verbal intelligence.

As in the previous category (correspondence of content to situation), differences in means between the two cultural groups disappear on partialling out the contribution of intelligence and/or of education.

5. Quality of Sentences

The sentences, as defined in the description of the units of analysis, have been evaluated in regard to structure and length.

(1) Sentence Structure

A sentence need not be "good" in terms of its structure in order to be understood. The relation between clauses might be perceived without the appropriate conjunction and neglect of even the most elementary principles of syntax might not hinder the hearer's understanding. Nevertheless, it was assumed that such occurrences in the mothers' speech are of imprtance for the child's development. Each sentence was therefore evaluated on the general qualitative scale, used also for the evaluation of the quality of correspondence between the content of the sentence and the relevant situation.

Mother's use of suitable conjunctions is assumed to lead the child to a better understanding of the relationship contained in the sentence. The rationale presented for all "structural" words analyzed in the preceding section holds also for conjunctions alone. Conjunctions are evaluated separately because they are crucial for the structure of a whole sentence; moreover, they have been scored for the whole hour of mothers' speech and not only for a sample of 660 words.

The E (enriching) Level

The two variants of the "enriching" sentence structure are as follows:

(a) Complex or compound sentences, containing the appropriate conjunction or relative pronoun. "You don't undrstand this, because you are too young"; "Don't touch it, even if it's cold already"; Fetch me, please, the glass which I left in the kitchen"; "Do you know that daddy will be very angry?"

(b) Correcting the structure or the grammar of the child's sentence :
Child : "Red this box"; Mother: "Yes, this box is red".

The second variant appeared very infrequently - it was heard by the recorders only in the speech of six mothers to the three-year-old. The mean frequency was .7% in all. The younger child's sentences were not long enough to acquire a decidedly wrong structure; they were expanded (see E for correspondence to reality) rather than corrected.

With one exception, all mothers had at least one E structure in their speech to the older child; however, only 40% had such structures when addressing the one-year-old.

The C (Conventional) Level

Simple and correct sentences, rated neither as enriching, nor as insufficient or detrimental, were scored as conventional. A small number of units lacking a discernible structure were also included in this category if addressed to the younger child; it was mainly a string of syllables (dee-dee; na-na-na).

The C category was, understandably, the most frequent kind of structure in mothers' speech.

The I (Insufficient) Level

Only sentences addressed to the older child have been scored as insufficient in regard to structure, since the speech to the one-year-old seemed adequate even though quite independent of the rules otherwise governing the mothers' language.

There were two variants of the I level:

(a) Utterances lacking a discernible structure. This kind of utterance was recorded for seven mothers; it is probable that it occurred more frequently, but was unconsciously corrected by the recorders.

(b) Failure to correct the older child's verbal structure entailed not only a loss of an E scroe (for correction); it furnished also a negative score for missing an opportunity to improve the child's speech. (Since the smaller child's speech was not structured enough for the child to commit an obvious error, the mother's omission to correct was not scored).

Only 14 mothers disregarded entirely the need for correction; their mean score was 1.1%.

The D (Detrimental) Level

It seemed to the investigators that the use of a wrong conjunction, or a blatantly incorrect structure of a sentence, might impair the older child's feeling for verbal structure and consequently for verbal logic.

The following sentences were scored as D:

(a) Sentences which were so grossly incorrect, that they could be understood only through the modulation of the voice: "Shall a sweet give you auntie".

(b) Repetitions of the child's utterances containing errors in structure or grammar : Child - "there are two shoe", Mother - "Yes, two shoe". Such reinforcement of faulty habits of speech was quite exceptional; it appeared in the speech of five mothers with a mean frequency of 1.1% of the sentences addressed to the three-year-old.

As in the preceding aspects, the D scores have been added to the Insufficient level for further computations.

Overall Results on the "Sentence Structure"

The inter-rater reliability for this dimension was 95% for the three-year-old, and 99% for the one-year-old. The mothers' reliabilities were rho = .95 for the Enriching level, but only rho = .06 for the Insufficient and the Detrimental levels taken together. This is possibly due to the low frequency of this kind of verbal behavior.

The data are presented for each child in Table 15.

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Table 15: "Sentence Structure", by levels and by age of child

Levels and Variants	One-year-old		Three-year-old	
	Mean	Range	Mean	Range
All Levels	100.0		100.0	
Enriching :				
(a) Appropriate conjunction	1.3	0 - 8	8.9	0 - 19
(b) Correction of child's grammar	-	-	0.06	0 - 1
Conventional:				
(a) Simple, correct sentences	96.6	92 - 100	89.9	81 - 98
(b) No discernible structure	2.1	0 - 25	-	-
Insufficient:				
(a) No discernible structure	-	-	0.1	0 - 2
(b) Omission to correct	-	-	0.3	0 - 3
Detrimental:				
(a) Grossly incorrect structure	-	-	0.6	0 - 4
(b) Repetition of child's error	-	-	0.1	0 - 2

Almost all utterances directed toward the younger child were scored as conventional; the structure of speech addressed to the older child was more variegated, and difference in "Enrichment" in his favor is significant at the 5% level. Correlations over children and between levels (for the older child) were significant at the 5% level.

(2) Length of Sentences

The result on this dimension are affected not only by the specific conditions of this investigation (i.e. the fact that the addressees are children), but also, as already mentioned, by the shortness of the Hebrew sentence and the division of the speech into shortest possible units. Within these constraints, the words comprising a sentence might be counted either including or excluding the repeated words. For the sake of completeness, both ways of computation have been used and the data include the overall length of the sentence as well as the net length. Though the inter-rater reliability as to the division of speech into sentences was quite high (96% for both children), the consistency of the mothers was not high: it amounted to rho = .80 for the three-year-old and to rho = .70 for the one-year-old.

The means in Table 16 below have been computed for each mother separately and then as a mean of means.

Table 16: Mean length of sentence, by age of child

Mean length of sentence	One-year-old		Three-year-old	
	Mean	Range	Mean	Range
Including repeated words	3.4	2.1 - 4.4	4.0	2.9 - 5.0
Excluding repeated words	2.7	1.7 - 3.7	3.6	2.6 - 4.9

For both measures, the mean length of sentence was significantly correlated (p .01) in the speech to the siblings.

The sentences addressed to the older child are significantly longer; the mode, however, is the 3-words-sentence for both children, which is usually composed of a noun, a verb, and an additional word, e.g. : "What are you doing?"; "You are a good girl"; "I'll feed you"; "Put it back". (All these sentences consist in Hebrew of 3 words). The three-word-sentence accounts for 26% and 21% of the sentences addressed to the younger and to the older child, respectively.

The shortest sentence, consisting of one word, accounts for nearly 10% of speech to each child.

The longest sentence addressed to the one-year-old contained 12 words and ran as follows: "Well, darling, well, you are a good boy, so put it back". The two longest sentences addressed to the older child (16 and 14 words respectively) were: "I won't speak to you anymore, because you don't listen to Mummy, what I am saying"; "All right, but don't drop it because I cannot bend down every time".

Quality of Sentences in the Cultural Groups

As with the tables for other aspects, Quality of Sentences is analyzed in regard to other variables in Table 17.

Table 17: "Quality of Sentences." by dimensions, by age of children and by cultural groups

Age and Variants	Group Means		Correlation with		
			Mothers' level of		Child's
	Oriental	European	Education	I.Q.	Verbal I.Q.
One-year-old					
Sentence structure					
Enriching (%)	1.1	1.6	.16	.24	.23
Sentence length					
Overall	3.2	3.5	.12	.16	.27
Net	2.6	2.9	.28	.20	.38[b]
Three-year-old					
Sentence structure					
Enriching (%)	7.3	11.1	.37	.39	.29
Insufficient (%)	1.1	0.7	-.44[ab]	-.29[a]	-.24
Sentence length					
Overall	3.0	4.0	.22	.07	.04
Net	3.6	3.7	.35[a]	.19	.15

a - also significant within the European group alone.

b - also significant within the Oriental group alone.

The infrequent "enriching" sentence structure appearing in the speech to the one-year-old is independent of the mothers' educatio of I.Q. and there is no correlation between it and the child's predicted I.Q. For the three-year-old, three correlations with the mothers' intellectual level are significant at the 1% level or at the 5% level, but the correlation with the child's I.Q. is significant only at the 5% level and only for the "enriching" level. There is scarcely any difference between the two cultural groups in the gross length of sentences addressed to the three-year-old and the difference in regard to the one-year-old is not significant. The mean overall number of words in the sentence is scarcely a meaningful measure for the quality of mothers' speech, since it lacks significant correlations with the background variables. However, after the repeated words have been excluded from the count, the net mean length of the sentence does show a dependence on the mothers' level of education. It has also predictive value for the smaller child's I.Q., especially in the Oriental group.

6. Repetitiveness of Speech

As already mentioned, mothers tend to repeat their utterances when speaking to children (Jespersen, 1925; Lewis 1959). This tendency might appear in several forms, e.g. (a) repetition of the main idea in other words ("leave it, this will do"); (b) repetition of a sentence more or less verbatim after some intervening utterances; (c) immediate repeating of a sentence or a part of it. These forms of repetitions are probably of unequal value for the child's development. The first is regarded as an expansion of vocabulary or an enriching of the situation (see "Attention to words" and "Correspondence of content to situation), but, except for a lowering of the TTR, the effect of the other two is unknown.

In so far as the intentions of the mother are concerned, it is probably immaterial, whether two very similar sentences are uttered in succession ("Go to bed now, go to bed") or whether the sequence is somewhat interrupted ("Go to bed, d'you hear me, quickly now, go to bed"). In both instances the mother might wish to stress a word or a message; it might also be just a habit of speech. Since we had no clues as to the role of the intervening sentences in reducing or even obliterating the sensation of repetition, it was decided to score it conservatively, i.e. to regard words as repeated only if they were uttered again in the same or in the next sentence.

The frequency of repetitions was assessed in two ways: as a percent of sentences containing a repetition of whatever length and as a mean number of repeated words per such sentence.

The inter-rater reliability for the mean length of repetition was 96% for both children; for the percent of repetitive sentence it was 88% and 93% for the younger and the older child respectively. However, the mother's consistency for the mean length of the repetition was not significant.

The mean results for repetitiveness of speech are presented in Table 18 for all mothers.

Table 18: Repetitiveness of mothers' speech by age of child

Measures of repetitiveness	One-year-old		Three-year-old	
	Mean	Range	Mean	Range
Percent of sentences containing a repetition	38.8	0 -68	16.2	2 -33
Mean number of repeated words	1.7	1.0- 2.9	1.9	1.0- 3.0

The present values are significantly higher for the younger than for the older child. Talking to the one-year-old leads the mother , on the average, to a repetition of words in more than a third of her sentences. The mean length of the repetitions is quite similar for both children, though the number of words in the sentence is smaller for the one-year-old. The correlation of the percentage of sentences containing repetitions in the speech and addressed to the older child with the percentage of such sentences in the speech addressed to the younger one is significant at the 1% level. It might probably be regarded as a verbal habit of the mother, negatively, though only slightly, dependent on her level of education and possibly present also in her speech to other persons. On the other hand, the mean length of the repetitions is correlated only with the length of the sentence (r = .44).

Though Jespersen's observation (1925) as to the frequency of repetitions in the verbal interaction with the baby is thus confirmed, this technique seems to be of value mainly if it consists of paraphrases. Simple reiteration of the words at the beginning or the end of sentences is only insignificantly correlated with the child's predicted intelligence. It was applied only seldom for the teaching of words or phrases, and then it did not seem to the observers to be really suitable for the child's level of understanding(see "Attention to words").

Repetitiveness of Speech in the cultural groups

Both ways of measuring the repetitiveness were used in order to analyze this attribute for the two groups. Means and correlations and background variables are given in Table 19.

Table 19: Repetitiveness of speech, by age of child and by cultural groups

Repetitiveness of Speech	Means of group		Correlation with		
			Mother's		Child's
	Oriental	European	Education	I.Q.	V. I.Q.
One-year-old					
Percent of sentences containing repetitions	39.6	37.6	-.27	-.12	-.19
Mean number of repeated words	1.8	1.7	.08	.05	.20
Three-year-old					
Percent of sentences containing repetitions	17.8	13.9	-.42[a]	-.35[a]	-.25
Mean number of repeated words	1.8	2.0	.05	.05	-.05

a - Correlation also significant within the European group alone.

Oriental mothers have more repetitive sentences than European mothers; however, partialling out the mother's level of education reduces the difference to zero.

The proportion of repetitions in mother's speech is only slightly dependent of the mother's educational level as long as she talks to the one-year-old, but the inverted relation reaches significance at the 1% level when the older child is addressed. On the whole, the trend to repeat parts of the sentences correlates negatively with the children's verbal I.Q. The one exception is the small (and not significant) positive correlation between the mean number of repeated words and the younger child's predicted I.Q. level. This could point to a possibility that a judicious use of the technique might have a beneficial influence, though the general inclination to reiterate the same words is of no importance.

IV. SUMMARY AND CONCLUSIONS

1. Main results

Principal findings in the study are presented in this chapter by means of three tables.

Table 20 reports means and ranges of the main 22 variables employed to evaluate the speech of mothers to their children. The correlations of each variable over the two children are also inserted in order to examine the degree of similarity in the speech addressed to the siblings. Since almost all differences in mean scores between the two cultural groups were accounted for by differences in intelligence or education, only data for the entire group of 57 mothers are given in this table.

Table 20 : Correlations between siblings, means and ranges for the 22 variables of mothers' speech at home, by age of the addressed child

Dimensions and Variables	Correl.(*) between siblings	Age of addressed child					
		One-year-old			Three-year-old		
		Min.	Mean	Max.	Min.	Mean	Max.
Amount of Speech							
1. No. of words	.32*	3	154	496	83	429	1177
2. No. of sentences	.28*	2	44	127	28	107	271
3. % of words addressed to		1	26	61	39	74	99
4. % of sentences addressed to		2	29	62	38	71	98
Topics of Speech							
5. Caretaking		0	41	90	0	21	65
6. Incidental		0	56	88	18	68	95
7. Alerting		-	-	-	0	11	27
8. Emotional		0	3	16	0	0.2	3
Correspondence to Situtation							
9. Enriching	.45**	0	5	19	0	11	29
10. Adequate		21	67	100	25	75	92
11. Vague		0	4	17	0	4	14
12. Insufficient	.34**	0	23	63	2	10	24
Quality of Words							
13. % of sent. cont. E words	.28*	0	3	14	0	3	8
14. % of sent. cont. I words		0	7	24	0	7	19
15. % of "structural" words		0	1	12	1	3	5
16. Type/Token Ratio	.32*	.29	.42	.66	.25	.40	.59
Quality of Sentence							
17. % of E sentence structures		0	1	8	0	9	19
18. % or I sentence structures		-	-	-	0	1	4
19. Mean sentence length		2.1	3.4	4.4	2.9	4.0	5.1
20. Mean net sentence length	.47**	1.7	2.7	3.7	2.6	3.6	4.9
Repetitiveness of Speech							
21. % of sent. with repetitions	.38**	0	39	68	2	16	33
22. Mean No. of repeated words		1.0	1.7	2.9	1.0	1.9	3.0

(*) only if significant at the 5% level at least.

* significant at the 5% level.
** significant at the 1% level.

Notwithstanding the differences in the means there is a certain inclination on the part of many mothers to adhere to their individual way of speech with children of differing ages. There is a tendency for a mother to speak habitually much or little, to use longer or shorter sentences in addressing both children and to repeat parts of a sentence more or less often. The disposition to "enrich" situations or words or - conversely - to waste opportunities of adequate speech is also an attribute of mothers' speech which tends to prevail in relation to both children. The fact that most of these attributes correlate also with the mothers' intellectual level is not necessarily an indication that any similarity in the speech to both children is mediated mainly by intelligence or education.

Though it is not known whether the means and the ranges of mothers' speech would deviate significantly from the obtained data with a change in situation, some differences favoring the three-year-old are worth stressing. (a) mothers speak to him usually more; (b) they address him in longer sentences, but they repeat parts of those sentences less frequently; (c) the sentence structure tends to be better, partly because more structural words are used; (d) the references to outside situations are more often "enriching" and less often "insufficient"; (e) the topics of the conversation touch less on the caretaking activities and more on "incidental" subjects. On the other hand, the quality of words used in conversation does not show any clear-cut differneces between the two ages, probably because of the difficulty of compairing words uttered at the two children. According to the TTR each word out of the analysed 660 words has been used, on the average, 2.5 times.

Individual differences between mothers are reflected in the comparatively wide ranges; though many mothers have zero scores, some attain values far in excess of the mean. Yet on each qualitative scale 70 - 90% of the mothers' speech is "conventional", i.e. neither distinctively "enriching" nor "insufficient".

Table 21 deals with the correlations of the 22 variables with the mothers' intelligence or educational level (whichever coefficient is higher). The data are given separately for each cultural group and also for all 57 mothers together. Since the minimum significant r value for the entire group is .262 and since the correlations for the 57 mothers were, in most cases, only a statistical outcome of the higher correlations obtained for a separate cultural subgroup, the inserted coefficients have not been restricted to those significant for the given group. Instead, all coefficients higher than r = .262 were included, the significant ones being marked by asterisks in the usual manner. The same method was applied to the third table in this chapter.

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Table 21: Correlations of 22 variables of mothers' speech with mothers' IQ or educational level, by age of child addressed

Dimensions and Variables	Speech adressed at the					
	One-year-old			Three-year-old		
	OR N=(33)	EU N=(24)	ALL N=(57)	OR N=(33)	EU N=(24)	ALL N=(57)
Amount of Speech						
1. Number of words						
2. Number of sentences						
3. Percent of words	.39*	.28				
4. Percent of sentences	.29					
Topics of Speech						
5. Caretaking		.36				
6. Incidental		.27		.28	.34	
7. Alerting					.51*	
8. Emotional		.41*				
Correspondence to Situation						
9. Enriching sentences (%)	.34*	.51*	.42**		.47*	.52**
10. Adequate sentences (%)						
11. Vague sentences					-.48*	-.28*
12. Insufficient sentences(%)		-.28*		-.39*		-.33*
Quality of Words						
13. Enriching words (in sentences) (%)		.52*	.40**			
14. Insufficient words (in sentences) (%)				-.42*	-.38	-.39**
15. Structural words (% of words)		.31		.47*	.35	.53**
16. Diversity (Type/Token Ratio)	.43*			.44*	.47*	.44**
Quality of Sentences						
17. Enriching structure(%)		.42*			.39	.39**
18. Insufficient structure(%)					-.50*	-.44**
19. Overall length (No. of words)					.31	
20. Net length (No. of words)	.29		.28*	.27	.44*	.35**
Repetitiveness of Speech						
21. % of sent. cont. a repetition	-.33		-.27*		.49*	-.42**
22. Mean No. of repeated words		.28	.28*			

The mothers' intellectual level affects her speech to the one-year-old on about a third of the measured variables, if each cultural group is regarded separately. For the group as a whole, the significantly affected variables are the net mean length of the sentence, the tendency to repetitions of words in a sentence and the inclination to "enrich" the situations and to explain words. However, only the "enriching" reference to the situation shows a significant correlation with the mothers' intellectual level also for each subgroup separately.

Owing to the comparatively high intercorrelations between the variables, multiple R is of no value; the mothers' intellectual level accounts for about 11% of the Oriental mothers' and for about 26% of the European mothers' variance of speech to her one-year-old child (computed on the basis of "enriching" reference to situation). Thus, the Oriental mothers' speech quality is somewhat less dependent on her intellectual level than is the speech quality of the European mothers.

Speech addressed at the three-year-olds is correlated with the mothers' intellectual level, for the entire group, more often and at a higher level of significance. The most obvious differences for the age of the child appear in the "insufficient" speech which is not correlated with the mothers' cognitive abilities when she speaks to the one-year-old, but shows significant negative correlation for the verbal interaction with the three-year-old.

The higher correlation is especially marked for the Oriental subgroup - about 22% of the variance is common for the speech addressed at the older child and the mothers' intelligence or education.

The third table in this chapter (Table 22) contains correlations of the 22 variables with the children's intelligence,measured with the help of a test for the three-year-old and predicted to be the same for the one-year-old. As in Table 21, the lowest inserted correlation coefficients are r = .262.

Table 22: Correlations of 22 variables of mothers' speech with the children's IQ, by age of child and by cultural groups

Dimensions and Variables	One-year-old			Three-year-old		
	OR N=(33)	EU N=(24)	ALL N=(57)	OR N=(33)	EU N=(24)	ALL N=(57)
Amount of Speech						
1. Number of words		.35				
2. Number of sentences		.31				
3. % of words addressed to	.33					
4. % of sentences addressed to						
Topics of Speech						
5. Caretaking					-.40	-.28*
6. Incidental					.44*	.32*
7. Alerting					.60**	.27*
8. Emotional						
Correspondence to the Situation						
9. Enriching sentences (%)	.28	.37	.38**		.55**	.39**
10. Adequate sentences (%)	.32				-.29	
11. Vague sentences (%)					..41*	
12. Insufficient sentences (%)	-.31	-.31	-.35*	-.50**		-.36**
Quality of Words						
13. Enriching words (in sentences)(%)		.57**	.36**		.38	.30*
14. Insuff. words (in sentences)(%)						
15. Structural words (% of words)				.52**	.27	.48**
16. Diversity (Type/Token Ratio)				.29	.49*	.38**
Quality of Sentences						
17. Enriching Structure (%)		.37				.29*
18. Insufficient Structure (%)						
19. Overall length (No. of words)	.38*		.27*			
20. Net length (No. of words)	.41*		.38**			
Repetitiveness of Speech						
21. % of sent. cont. a repetition		.32				
22. Mean length of the repetition	.28					

For the group of 57 mothers five variables of the speech directed at the one-year-old can be regarded as predictive for his I.Q. (Variables 19 and 20 both relate to the mean length of sentence). They are: "enriching" of situations and words, refraining from insufficient reference to situation and speaking in longer and possibly better structured sentences. As with the mothers' intellectual level, the variables are highly intercorrelated and the computation of multiple R does not materially change the contribution of one of these attributes of speech to the child's intelligence. It amounts to about 19% of the variance (computed on the basis of r = .44 obtained for the sum of "enriching" and "insufficient" references to situation).

Correlations with the I.Q. of the older child are somewhat higher for the entire group; this is probably an outcome of the feedback which mothers get from the older child. Thus, since most of the Oriental three years old children have spoken very little during the observation (the correlations between the mothers' speech and the children's I.Q. are much less than the correlations for the European group), the computation of common variance would be meaningless.

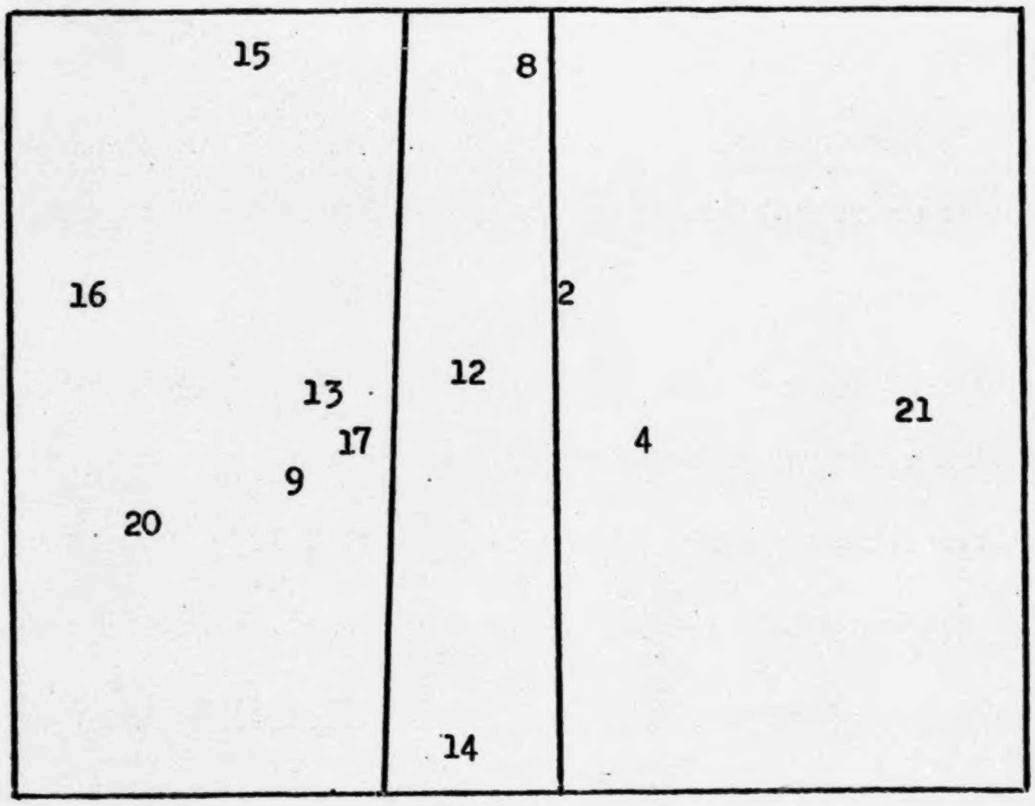
Intercorrelations among the main speech variables were analyzed by Guttman's Method of Smallest Space Analysis (Guttman, 1966).

The space relations between the several attributes of mothers' speech are presented, for each age separately, in two diagrams. Both diagrams can be regarded as simplexes, composed of three elements: (a) amount of speech, including amount of repetitions - on the right-hand side of the diagram; (b) "insufficient" attributes of speech - the middle part of the diagram; (c) "enriching" speech and atrributes expressed as "continuous" variables - on the left-hand side of the diagram. ("Continuous" variables refer to measures not à priori designated as "enriching" or insufficient". Therefore nothing is presupposed as to the point on the continuum which would divide the "poorer" from the "better" level of quality). The one exception from the simplex pattern is that of "Structural Words" addressed to the three-years-olds (diagram 2, variable 15) which should have appeared on the left-hand side of the diagram.

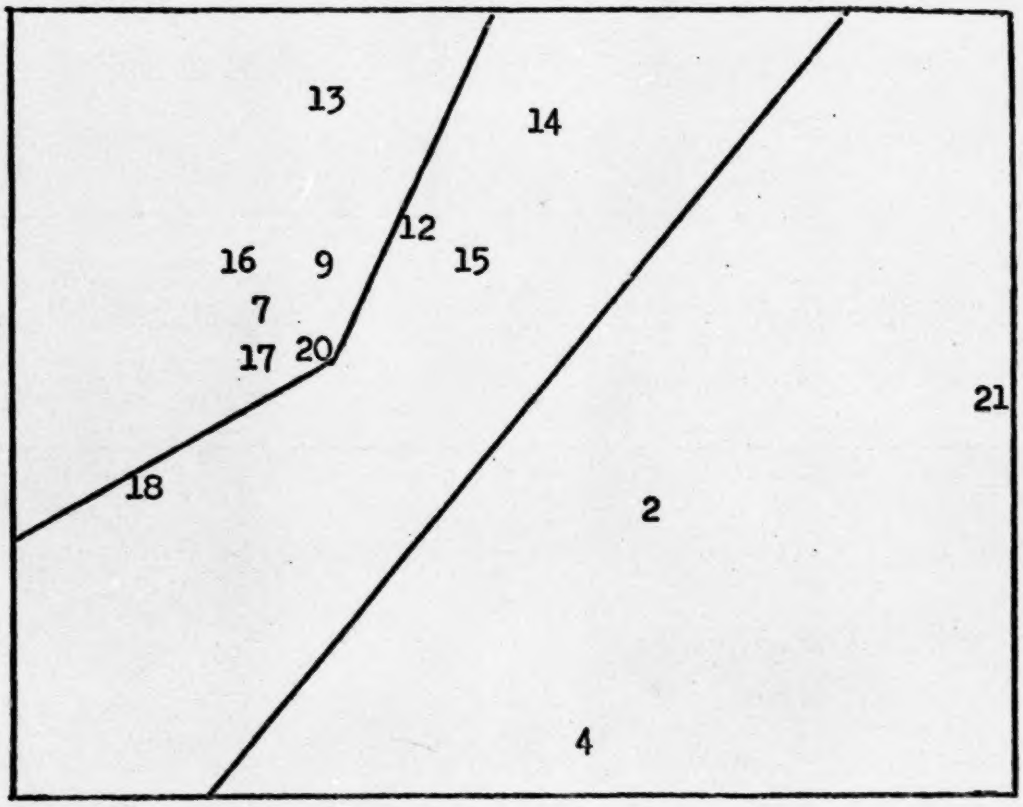
The diagram common to both age-groups has, for two dimensions, a coefficient of alienation of .26 which, according to Guttman, does not permit of a meaningful analysis.

Diagrams by cultural groups are not presented because of the low stability of correlations derived from a small number of subjects.

Space Diagram 1: Speech addressed to the one-year-olds


15
8
16
2
12
13
21
17
4
9
20
14

Space Diagram 2: Speech addressed to the three-year-olds


13
14
12
16
9
15
7
17
20
21
18
2
4

The numbering of variables of speech follows the numbers used in Tables 20-22.

2. Conclusions

A person's verbal behavior in situation depends on a multitude of factors, stable or fluctuating, originating from the person himself or from the environment. Since a clear differentiation of the "inner" and the "outside" factors is impossible, they might be listed as: (a) the person's cultural background, (b) his intellectual level, (c) his emotional make-up, (d) his momentary mood, (e) other personal traits like sex, age etc., (f) the time, place, content etc. of the situation, (g) the personalities of other participants in the situation, (h) the relationship between the person and the participants.

This study has been conducted in a specific situation, consisting of a mother (young enough to have a child aged 1 year), her two children aged about 1 year and about 3 years, and two observers. The mother was engaged in her daily tasks at home during the morning hours. Thus, factors (e), (f), (g) and (h) have been roughly controlled. Factors (a), (b) and the child's age were the independent variables, but neither factors (c) nor (d) were taken into account. The results and conclusions must therefore be considered with these restrictions in mind.

In accordance with the "General Outline of the Study", the first aim was "to describe systematically and to classify the speech input received by children of specified ages from their mothers at home". This has been done in regard to several aspects, measured by means of many variables. Some of the attributes, notably the amount of speech, did not yield much information, probably because of the specificity of the situation. The topics of speech were also of little use with the possible exception of talk to the three-year-old about the one-year-old which is not a topic in the strict sense of the word, but a method of verbal behavior. The remaining four aspects of speech, i.e. extent of correspondence between speech and situation, quality of words and of sentences and verbatim repetitions within a sentence, have been meaningfully measured. The results yield preliminary norms (some of them independent of the Hebrew language), suitable for the evaluation of a given mother's manner of speech. The scales are mutually independent and the choice of any one would depend on the aim of the researcher. For the special purpose of evaluating mother's speech as a factor in the intellectual development of her very young child, the scale of "Correspondence to the Situation" seems to be most useful, especially if "Enriching" words were added.

The second aim of the study was "to investigate the interdependence between the quality of the mother's speech, her socio-cultural background and her children's level of intelligence". The results show that practically all differences in speech levels between the cultural groups disappear when the differences in levels of education and intelligence are taken into account. However, there seem to be some cultural differences in the intercorrelations between the attributes and the mothers' as well as the children's intellectual level. It might therefore be supposed that a given verbal behavior can be conditioned, at least partly, by factors not measured in the present study. In itself, this result is not surprising, but the present data permit of no further discussion.

The children's level of intelligence does show several significant correlations with the measures of mothers' speech. This is especially important in relation to the speech directed at the younger child, since his participation is, with very few exceptions, not verbal. Instead of his own, directly unmeasurable I.Q., the I.Q. of his sibling has been taken as the best available estimate and it seems that the mother's speech accounts for about 20% of the I.Q. variance. Of the four significant predictors in mother's speech, three are correlated also with her own intellectual level; it can therefore be concluded that speech is one of the ways in which the mental level of the mother affects the child's intelligence. This factor is, of course, impure insofar as the question of heredity versus environment is concerned. However, at least one predictive attribute of mother's speech is not clearly correlated with her mental level, namely the omission of opportunities to speak at least adequately, i.e. silence or use of insufficiently explicit sentences.

The third aim was to determine whether any of the important attributes of the mother's speech might be modified according to her intentions. The underlying notion of the authors was that if a given kind of verbal behavior is not too much dependent on the intelligence or education, the mother, given sufficient motivation, might perhaps be persuaded to change her accustomed ways of speaking to the child. Since none of the obtained correlations are high, no a priori hindrance seems to preclude the possibility of such change. In terms of content, nothing that the better educated mothers said to their one year old children in order to explain to them their surroundings was really outside the knowledge or experience of the less educated mothers in the sample.

However, the obtained results have no bearing on the actual readiness and ability of the mother to change her verbal behavior in the desired direction. This is the subject of an ongoing experiment, the preliminary results of which seem to indicate that this readiness and ability are correlated with the mother's intellectual level.

V. APPENDICES

1. Rating and scoring instructions

As mentioned in the chapter on "Variables dealt with in the study", the two basic units are the word and the sentence. For simplicity's sake each unit written separately was scored as a word, though it includes, in Hebrew, the definite article and a considerable proportion of the prepositions. A sentence, for this study, is the shortest meaningful sequence of words, including repeated words and also words intended to attract the child's attention (usually his name or other appelation). Since many sentences are often repeated verbatim, an arbitrary limit of three words was decided upon as the maximum length of a repetition still to be regarded as belonging to the main sentence.

The mother's speech was regarded as consisting of two separate parts, one for the younger and one for the older child. The record has therefore to be divided and marked accordingly, sentence by sentence. If in doubt, the sentence should be classified as directed at the older child. (Speech addressed to the observers or to someone other than the children is disregarded). The number of sentences (or of words) spoken to a child serves as a base for the computation of scores, percentages or means. The overall sum of sentences (or words) spoken by the mother to both children was used only for computing the percentage of speech addressed to the younger child. Though the absolute amount of sentences (or words) is made less important by this method of scoring, the minimum observation time needed for an acceptable level of reliability has not yet been determined. It seems to the authors that no conclusions should be arrived at from records of less than 30 minutes observation.

As already stated, each variable, including the "enriching" and the "insufficient" levels of the qualitative dimensions, can be computed and used singly or in any desired combination. The method of calculation for each variable is described in the following instructions.

1. Amount of speech. This can be expressed as a number of sentences (or words) per given span of time and also as a percentage of speech directed at the younger child. The data for sentences and for words are highly correlated (r = .94); the computation of scores on additional variables requires knowledge of at least one of these basic values.

2. Topics of speech. Differentiation between "incidental" topics spoken about during nursing and during other activities (see "Topics of Speech"), had no special merits and the main classes are now "nursing" and "incidental". The two other categories are not topics in the true sense of the word.

Each sentence is classified separately and designated (for computer purposes) by a digit, as follows :

Topic	Digit
Caretaking (nursing, feeding, bathing, dressing etc.)	1
Other topics (play, speech about weather, house-keeping activities etc.)	2
Emotional (no other discernible topic)	3
Alerting(sentence adressed to the older child but concerned with the younger one, irrespective of content)	4

Scores are computed for each topic as percentages of all sentences addressed to the child.

3. Correspondence of content to situation. Each sentence is rated as "enriching", "conventional", "insufficient" or "detrimental" and marked by the appropriate digit :

Level		Digit
"Enriching" :	causes, outcomes, comparisons, juxtapositions, generalizations	1
	naming of inner state or behavior	2
	expanding child's utterance into "conventional" or "enriching"	2
	answering child's question by an "enriching" sentence	3
	"ironical" sentence	4

Level (cont.)		**Digit**
"Conventional" :	adequate sentence or question	5
	vague sentence or false assurance	6
"Insufficient" :	incomplete reference to situation	7
	inappropriate response to child's question	7
	no speech during caretaking (no sentence)	8
	no answer to child's "bona fide" questions, promptings or utterances (no sentence)	8
"Detrimental" :	contradiction other than false assurance	9

Scores for (a) the sum of "enriching" and (b) the sum of "insufficient" (including "detrimental") sentences are computed as percentages. If a mother had also omissions rated as 8, the divisor, i.e. the basic number of sentences actually uttered at the child has to be augmented by the sum of instances rated 8.

4. **Attention to Words.** Each sentence is rated for words defined as "enriching", "insufficient" or "detrimental". If a sentence contains no such words, it is rated as "conventional". If words of different quality, i.e. "enriching" and "insufficient" (or "detrimental") appear in the same sentence, it is first rated as "enriching" (digits 1,2 or 3); a second rating is added (7 or 9) for which the other variables are 0. The overall number of sentences is not changed.

The levels and the appropriate digits are as follows:

Level		Digit
"Enriching" :	naming of relevant, visible objects or persons	1
	adding a synonym or an antonym	2
	one of the preceding, in answer to child's question or other prompting	3
"Conventional":	words not otherwise specified	5
"Insufficient":	pronoun if no noun mentioned in 3 nearest sentences	7
	"baby words" to the one-year-old	7
	no correction of child's inappropriate word (no sentence)	8
"Detrimental":	"baby words" to the three-year-old	9
	use of an inappropriate word	9
	repetition of child's inappropriate word	9

Scores are computed as a percentage for (a) the sum of "enriching" and (b) the sum of "insufficient" (incl. "detrimental") sentences. If the record shows omissions (digit 8), the sum of pronounced sentences has to be increased by the number of omissions before being used as the divisor.

5. "Sentence Structure". The "enriching" level of this dimension is computed for the older and for the younger child, but the rating of "insufficient" and "detrimental" could be only rarely assigned to the speech directed to the one-year-old. Hence all sentences other than "enriching" were scored as "conventional" for the younger child.

Level		Digit
"Enriching" :	complex or compound sentence	1
	correction of child's error in sentence structure or grammar	2
"Conventional":	simple sentence	5
	string of syllables	6
"Insufficient":	(for the older child only):	
	no correction of the child's errors in sentence structure or grammar (no sentence)	8
"Detrimental":	(for the older child only):	
	very faulty sentence	9
	repetition of child's error (if not a joke)	9

Scores for "sentence structure" are percentages, computed, for the older child, for the "enriching" and the "insufficient" levels and, for the younger one, for the "enriching" level only. If the mother had any omissions in her speech to the three-year-old (digit 8), the number of her sentences at this child has to be increased by the number of omissions for computing percentages.

6. Overall length of sentence. The score is a mean, computed by dividing overall number of words by number of pronounced sentences.

7. Net length of sentence is also a mean, in computing which the number of repeated words is subtracted from the overall number of words.

8. Percent of repeated sentences is the sum of all sentences containing a repetition of any length divided by the sum of all sentences; the whole expressed as a percentage.

9. Length of the repetition is a mean, computed by dividing the sum of repeated words by the number of sentences containing a repetition.

2. Samples of Verbal Interaction between Mothers and their Children

In order to illustrate the analysis of mothers' speech, three representative fragments of records have been translated into English, and scored. Some of the 22 variables used to describe quality of speech in this study have not been computed, partly because they have not been found reliable (e.g. "Topics"), and partly because the translation has probably made the norms inapplicable, as in "structural words" and the TTR. Mean length of sentence (overall and net) has been computed but not evaluated.

The first mother (Y-N after the names of her children) seems to be interested in her children and their activities, at least on the superficial level of being ready to respond to their utterances. However, the responses are poor in regard to relevance and the rating of "insufficient" appears frequently for their content and wording. (Emotional relations between mother

-and children are left out of the analysis and the discussion). The mother changes the topics of speech very frequently, possibly on purpose - to distract the child - but more probably from habit. Regrettably, our method of evaluation does not touch on this characteristic. (For the most part, descriptions of the situations were inconclusive as to the desirability of changing the topic in order to quieten the child).

The second mother (E-S) is, on the whole, a fair representative of the many-faceted average level of verbal behavior. She is not overmuch concerned with her children's talk or behavior, being rather inclined to pursue her own train of thought (or song). Her lack of interest in continuing a given topic or activity is also conspicuous, and it often results in "insufficient" speech, i.e. in lack of reaction; but she is perfectly able, when feeling like it, to address her older child in quite good, long sentences. However, she does not "enrich" the situations.

The quality of speech of the third mother (T-M) is much better. She has a higher than average percentage of "enriching" speech and no "insufficient" sentences of any kind. This is not true, of course, for the whole of her record in which "insufficient" speech does occur, though not frequently.

The sentences in the following fragments have been printed according to the division made in the record. Each sentence is rated on 6 variables :

A-Topics, B-Correspondence to Situation, C-Quality of Words, D-Sentence Structure, E-Number of Words in the Sentence, F-Number of Words Repeated after being uttered in this or in the sentence immediately preceding. The digit 1 or 3 in parentheses before each evaluation denotes, by his approximate age, the child to whom the sentence was addressed.

* * *

A. Y-N - mother of Oriental origin, 2 years education, I.Q. = 71. Children: a girl of 12 months, Yoheved, and a girl of 3 years, 4 months, Nurith, I.Q. = 98.

	(Yoheved hurt herself in bed)	Age of child	A	B	C	D	E	F
M.	What is it, darling, what?	(1)	1	6	5	5	5	1
	come, oopla! (takes Y. up and tries to feed her)	(1)	1	5	5	5	2	0
	(to N.) Why don't you eat, darling?	(3)	1	5	5	5	7	0
	Do eat! (M. feeds Y.)	(3)	1	5	5	5	2	1
Y.	vocalizes during the feeding							
M.	What, what is it?	(1)	1	5	5	5	4	1
	(to N.) fetch it!	(3)	2	5	7	5	2	0
Y.	dummm ...... (approximately)							
M.	Mmm, finish some more	(1)	1	5	9	5	3	0
Y.	ah ... ah ...							
M.	ah ... ah ...	(1)	2	6	5	6	1	0
Y.	ah ... ah ...							

		Age of child	A	B	C	D	E	F
M.	What, what d'you want? Mm?	(1)	2	6	5	5	6	1
	No, sit! (gives Y. a key)	(1)	2	7	5	5	2	0
	Not in the mouth! (the key falls down, M. picks it up)	(1)	2	7	5	5	4	0
	Oopla!	(1)	2	6	5	5	1	0
	(to N.) Nurith (Y. bangs her cup with the key)	(3)	2	7	5	5	1	0
	(to Y.) Don't	(1)	2	7	5	5	2	0
N.	(plays with a bag). We have no bag, we have lost it							
M.	Have you lost it?	(3)	2	5	5	5	4	0
N.	Yes							
M.	Finish the banana	(3)	2	5	5	5	3	0
M.	(puts Y. back to bed) no speech	(1)	1	8	0	0	0	0
	(takes from Y. the key and gives her a doll instead) no speech	(1)	2	8	0	0	0	0
Y.	(cries)							
M.	(leaves the room)							

* * *

B. E-S - mother of Oriental origin, 8 years education, I.Q. = 89.

Children : a girl of 13 moths, Ella, and a boy of 3 years, 6 months, Shemtov, I.Q. = 111.

		Age of child	Evaluation A B C D E F
Sh.	We have got new curtains		
M.	But you won't touch them, will you?	(3)	2 5 5 5 8 0
	Would you mind her, so she wouldn't touch the stove, Shemmy?	(3)	4 1 5 1120
Sh.	Yes		
M.	(to Ella) Come here, come	(1)	2 5 5 5 3 1
E.	Mummy		
M.	What?	(1)	2 5 5 5 1 0
E.	This		
M.	What is it?	(1)	2 7 5 5 3 0
	(to Sh.) Don't push her, don't!	(3)	4 5 5 5 6 2
	Have you seen my slippers?	(3)	2 5 5 5 5 0
Sh.	No		
M.	(to Ella) Come, Ella, to Mummy	(1)	2 5 5 5 4 0
Sh.	embraces Ella, M. sings quietly, then whistles		
M.	Ella, come here	(1)	2 5 5 5 3 0
Sh.	Ella		
M.	(to Sh.) I'll be back at once	(3)	2 6 5 5 6 0
Sh.	(to Ella) The curtains shouldn't be touched		
M.	Let her be, Shemmy	(3)	4 5 5 5 4 0
	(some time later)		
M.	Finish your sweet, Ella, your sweet	(1)	1 5 5 5 6 2
	Mummy will put you to bed, all right?	(1)	1 5 5 5 8 0

		Age of child	Evaluation					
			A	B	C	D	E	F
E.	Mmm...							
M.	What? (hums a song)	(1)	2	7	5	5	1	0
M.	(to Sh.) Come,let's tidy up the toys in the playpen	(3)	2	5	5	5	10	0
Sh.	Now I'm going to take this (takes out a book) can I have it?							
M.	(sweeps the floor) no speech	(3)	0	8	0	0	0	0
Sh.	Mummy, take this (the dust-jacket of the book)							
M.	Have you taken it off again?	(3)	2	5	7	5	6	0
Sh.	But it falls off all the time							
M.	It falls off?	(3)	2	5	5	5	3	0
	You have torn all of them already	(3)	2	7	7	5	7	0

* * *

C. T-M - mother of European origin, 14 years education, I.Q. = 139.

Children: a girl of 15 months, Tiqua, and a boy of 3 years, Moshe, I.Q. = 137.

		Age of child	Evaluation					
			A	B	C	D	E	F
M.	Tiqua, shall I put your shoes on?	(1)	1	5	5	5	7	0
T.	Yes							
M.	Stockings, too?	(1)	1	5	5	5	2	0
T.	Yes							

		Age of child	Evaluation					
			A	B	C	D	E	F
M.	Come on, Tiqua	(1)	2	5	5	5	3	0
	Mummy will put your shoes on	(1)	1	5	5	5	6	0
	Where are your shoes, darling?	(1)	1	5	5	5	5	1
	Where are the shoes?	(1)	1	5	5	5	4	3
	Show me the shoes, darling	(1)	1	5	5	5	5	2
T.	utters meaningless syllables							
M.	the shoes	(1)	1	5	3	5	2	0
T.	cries							
M.	(tries to quieten T.) It's all right	(1)	3	5	5	5	4	0
	Now you are going to be a good girl	(1)	3	5	5	5	9	0
	Mummy'll put a rug on the floor	(1)	2	5	5	5	8	0
	And Tiqua shall play	(1)	2	1	5	5	4	0
	Don't cry (M. changes the diapers)	(1)	3	5	5	5	3	0
	Dia	(1)	1	5	1	5	1	0
T.	(finishes the word) ... per							
	(some time later)							
M.	(to Moshe) Where are the shoes?	(3)	2	5	5	5	4	0
Mo.	Whose shoes? Are the shoes new?							
M.	Yes, new	(3)	2	5	5	5	2	0
Mo.	So where are the old ones?							

		Age of child	Evaluation					
			A	B	C	D	E	F
M.	The white shoes were too small for her	(3)	2	1	5	5	8	0
	So we bought new ones	(3)	2	1	5	1	5	0
Mo.	Who did you give the old ones to?							
M.	We didn't give them away	(3)	2	5	5	5	6	0
	We are keeping them	(3)	2	1	2	5	4	1
	When she grows up, we shall show her how small her shoes were when she was small	(3)	2	1	1	1	18	1
	Your shoes, too, we have kept	(3)	2	1	5	5	6	1

Table 23: Summary of results for three mothers, evaluated according to means presented in Table 20, by age of child

Aspects and Variables	One-year-old						Three-year-old					
	Scores			Evaluation[a)]			Scores			Evaluation[a)]		
	Y-N	E-S	T-M	Y-N	E-S	T-M	Y-N	E-S	T-M	Y-N	E-S	T-M
Amount of Speech												
1. No. of Words[b)]	30	29	64				19	67	53			
2. No. of Sentences[b)]	10	8	14				6	10	8			
3. % of Words[c)]	61	30	55	+	+	+	39	70	45			
4. % of Sentences[c)]	62	44	64	+	+	+	38	56	36			
Topics of Speech												
5-6. Not computed												
7. Alerting	inapplicable						0	30	0	-	+	-
8. Emotional	0	0	21	-	-	+						
Corresp. to Situation												
9. Enriching (%)	0	0	7	-	-	+	0	9	62	-	-	+
10-11. Not computed												
12. Insufficient (%)	42	25	0	-	-	+	17	18	0	-	-	+
Quality of Words												
13. Enriching (%)	0	0	14	-	-	+	0	0	25	-	-	+
14. Insufficient (%)	10	0	0	-	+	+	17	20	0	-	-	+
15-16. Not computed												

Aspects and the Variables	One-year-old						Three-year-old					
	Scores			Evaluation a)			Scores			Evaluation a)		
	Y-N	E-S	T-M	Y-N	E-S	T-M	Y-N	E-S	T-M	Y-N	E-S	T-M
Quality of Sentences												
17. Enriching struct. (%)	0	0	0	-	-	-	0	10	25	-	+	+
18. Insufficient struct.(%)	inapplicable						0	0	0	+	+	+
19. Overall length d) (words)	3.0	3.6	4.6				3.2	6.7	6.7			
20. Net length d) (words)	2.7	3.2	4.5				3.0	6.1	6.7			
Repetit. of Speech												
21. Sent. cont. a repet. (%)	30	25	37	+	+	+	17	10	38	=	+	-
22. Length of repet. (words)	1.0	1.5	2.0	-	-	+	1.0	2.0	1.0	+	-	+

a) + above mean.

− below mean.

= equal to mean.

b) cannot be evaluated on the base of a fragment of speech.

c) evaluated only for the younger child, since scores for both children add up to 100%.

d) cannot be evaluated by norms prepared for the Hebrew language.

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Mean values for several attributes of mothers' speech to their

two (or three) children, by age of child

Age group	No. of children	No. of sentences*	No. of words*	Length of sentences	% of sentences containing repetitions	Length of repetitions	% of sentences	
							enriching	insufficient
11.5 mo.	44	16.6	53.5	3.1	28.2	1.3	4.7	12.2
2;6	20	21.2	76.1	3.5	16.3	1.8	5.2	9.7
4;2	37	24.6	95.1	3.7	10.2	1.6	7.4	5.3
All older siblings	57	23.4	88.4	3.6	12.3	1.4	6.6	6.8

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* spoken by the mother during 30' of observation to the child

Analysis of Mothers' speech to their children at home.

1. Topics of speech (percentages)	Age of child	
	One-year old	Three-year-old
(a) Nursing	41	21
(b) Incidental	42	60
(c) Incidental during nursing	14	8
(d) Expressions of emotion	3	0.2
(e) "Alerting" the older child about the younger one	--	11

* * * * * * * * *

2. Correspondence to situation (percentages)	One-year old		Three-year-old	
(a) "Enriching" speech		7.3		13.5
reasons and other relations	1.5		7.3	
naming of relevant objects, inner states and behavior	4.7		4.5	
amplifications of child's utterances or answering with explanation	0.8		1.4	
ironical speech	0.3		0.6	
(b) "Conventional" speech		69.7		76.2
adequate speech	65.5		72.3	
false assurances and vague questions	4.2		3.9	
(c) "Insufficient" speech		22.4		9.8
indetermined sentences	14.5		6.1	
inadequate responses	2.6		9.2	
lack of speech	5.3		0.8	
(d) "Detrimental" speech		0.6		0.5

* * * * * * * * *

3. Quality of sentences	One-year old	Three-year-old
(a) Mean length of sentence (words)	3.4	4.0
(b) Percent of sentences directed at	29.4	73.6
(c) Percent of sentences containing repeated words	38.8	16.2
(d) Mean No of words repeated in (c)	1.7	1.9

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Dr. Gina Ortar
May 14, 1970